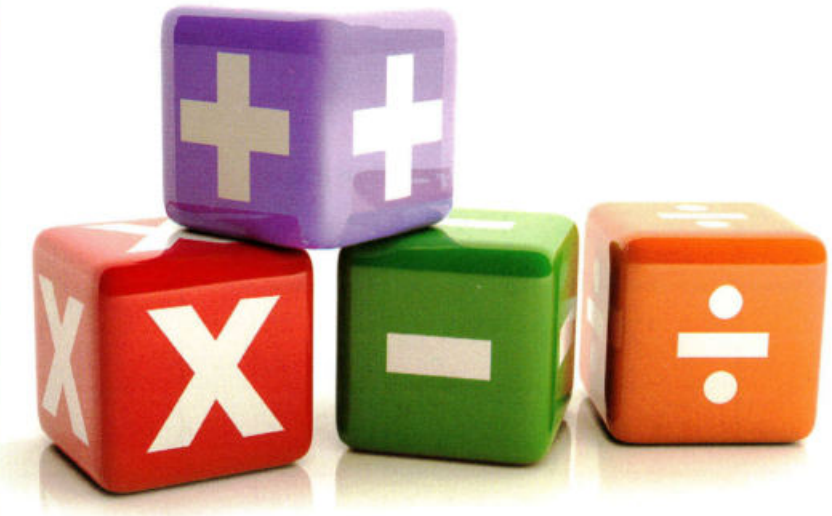
Exercise **1**

Factorizing quadratic trinomial in the form : $x^2 + bx + c$



From the school book

Remember Understand Apply Problem Solving

Interactive test

1 **Find :**

1. Two numbers such that their product = 30 and their sum = 11
2. Two numbers such that their product = 12 and their sum = – 8
3. Two numbers such that their product = – 18 and their sum = 3
4. Two numbers such that their product = – 15 and their sum = – 14

2 **Factorize each of the following :**

1. $x^2 + 8x + 15$
2. $x^2 + 11x + 10$
3. $x^2 - 7x + 12$
4. $x^2 - 17x + 30$
5. $x^2 + 5x - 14$
6. $x^2 + 4x - 12$
7. $x^2 - 6x - 16$
8. $x^2 - 3x - 10$

3 **Factorize each of the following :**

1. $x^2 + 5xy + 6y^2$
2. $b^2 + 3bc - 10c^2$
3. $x^2 - 15xy + 36y^2$
4. $x^2 - 5xy - 24y^2$

4 **Factorize each of the following :**

1. $15a + a^2 - 34$
2. $22a - 75 + a^2$
3. $-10 + x^2 + 3x$
4. $x^2 + 21 - 10x$

5 **Factorize each of the following :**

1 $x^4 + 9x^2 + 18$

2 $x^4 - 8x^2 + 15$

3 $\ell^6 - 6\ell^3 - 40$

4 $a^4 + a^2b^2 - 56b^4$

6 **Factorize each of the following :**

1 📖 $5x^2 - 10x - 15$

2 $2a^2 + 28a + 96$

3 $y^3 + y^2 - 6y$

4 📖 $x^3 - 3x^2 - 28x$

5 $3x^2 - 42 - 15x$

6 $18x - 15x^2 + 3x^3$

7 $-2x^2 - 2x + 40$

8 📖 $-x^2 + 2x + 63$

9 📖 $a^2b^2 - 24ab^2 + 143b^2$

10 $2a^4 - 24a^2b^2 - 26b^4$

7 **Factorize each of the following :**

1 $x(x + 7) + 10$

2 $x^2 - 4x - 3(x - 2)$

3 $(a - 4b)(a + 4b) + 6ab$

4 $x^2(x - 23) + 60x$

5 $(x - 4)(x - 9) - 2(x + 5)$

8 📖 **Find the value of $c \in \mathbb{Z}$ such that the expression will be factorized , then factorize it :**

1 $x^2 + cx - 15$

2 $x^2 - 7x + c$

3 $y^2 - cy + 29$

4 $a^2 + a - c$

9 **Complete :**

1 $x^2 - 11x + 18 = (x - \cdots\cdots)(x - \cdots\cdots)$

2 $x^2 + 5x + 6 = (\cdots\cdots)(x + 2)$

3 $x^2 + \cdots\cdots + 35 = (x + \cdots\cdots)(\cdots\cdots + 5)$

4 If $(x - 2)$ is a factor of the expression : $x^2 - 8x + 12$, then the other factor is $\cdots\cdots$

5 $(x - \cdots\cdots)$ is a factor of the expression : $x^2 - x - 6$

6 If $(x + 2y) = 4$ and $(x - y) = 1$, then the numerical value of the expression $x^2 + xy - 2y^2$ is $\cdots\cdots$

7 If $x^2 - 2xy - 3y^2 = 7$, $x + y = 1$, then $x - 3y = \cdots\cdots$

10 **Choose the correct answer from those given :**

1 If the expression : $x^2 + 7x + a$ can be factorized , then a may be equal to $\cdots\cdots$

(a) 8 (b) 10 (c) 18 (d) 49

2 If the expression : $x^2 - 3x + c$ can be factorized , then c may be equal to .....

(a) 1 (b) 2 (c) 4 (d) 6

3 For the expression : $x^2 - x - k$ can be factorized , then $k \neq$ .....

(a) 12 (b) 30 (c) 6 (d) 8

4 If the expression : $x^2 + ax + 2$ can be factorized , then a may be equal to .....

(a) 1 (b) 2 (c) 3 (d) 4

5 If the expression : $x^2 + bx - 10$ can be factorized , then b may be equal to .....

(a) 3 (b) 2 (c) 1 (d) – 1

6 If the expression : $x^2 - cx + 12$ can be factorized , then c may be equal to .....

(a) – 1 (b) 4 (c) 7 (d) 1

7 Which of the following numbers can be added to the expression : $x^2 - 8x + 5$ to be factorized ?

(a) 1 (b) 2 (c) 4 (d) 5

Geometric Application

11 The area of a rectangle is $(x^2 + 6x + 8)$ cm^2 and its length = $(x + 4)$ cm. Find each of its width and its perimeter in terms of x

For excellent pupils

12 **Factorize the following :** $(x - 1)^2 - 2(x - 1) - 8$



Exercise 2

Factorizing quadratic trinomial in the form : $a x^2 + b x + c$ where $a \neq \pm 1$

From the school book



Remember · Understand · Apply · Problem Solving

Interactive test

1 **Factorize each of the following expressions :**

1 $2x^2 + 3x + 1$

2 $3a^2 + 7a + 2$

3 $5z^2 - 7z + 2$

4 $3x^2 - 14x - 5$

5 $5x^2 + 4x - 12$

6 $3x^2 + 10x + 8$

7 $6x^2 - 11x + 3$

8 $5a^2 - 18a + 16$

9 $3y^2 + 7y - 6$

10 $8z^2 + 2z - 3$

11 $4y^2 + 5y - 21$

12 $12a^2 - a - 6$

2 **Factorize each of the following expressions :**

1 $2x^2 - 5xy + 2y^2$

2 $3x^2 - 20xy - 7y^2$

3 $6a^2 + 5ab + b^2$

4 $2y^2 + yx - x^2$

5 $10a^2 + 11ab - 18b^2$

6 $6x^2 - 47xy - 63y^2$

7 $7x^4 + 23x^2y - 30y^2$

3 **Factorize each of the following expressions :**

1 $6x^2 - 21x + 18$

2 $8x^2 - 28x - 60$

3 $25m - 10 + 15m^2$

4 $8x^3 - 27x^2 - 20x$

5 $6x^3 + 14x^2 + 8x$

6 $18x^5 + 33x^3 - 30x$

7 $21x^2y^2 + 6x^2y^3 - 15x^2y^4$

8 $12(c + d)x^2 + 68(c + d)x + 80(c + d)$

4 **Factorize each of the following :**

1 $2X(X+3)+13X+24$

2 $4X(3X+7y)-5y^2$

3 $5y^2-4X(7y+3X)$

4 $(5b-2)^2-4b-5$

5 **Complete the missing terms :**

1 $5X^2-2X-7=(5X-\cdots\cdots)(X+\cdots\cdots)$

2 $3X^2+10X+8=(\cdots\cdots+4)(X+\cdots\cdots)$

3 $6X^2-11X-10=(2X-\cdots\cdots)(\cdots\cdots+2)$

4 $3X^2-7X+2=(\cdots\cdots-2)(\cdots\cdots-1)$

5 $3X^2+7X-6=(3X-\cdots\cdots)(\cdots\cdots+\cdots\cdots)$

6 $2X^2+X-6=(\cdots\cdots-\cdots\cdots)(X+\cdots\cdots)$

7 $2X^2-\cdots\cdots-\cdots\cdots=(2X+3y)(\cdots\cdots-2y)$

8 $5X^2-3Xy-\cdots\cdots=(X-y)(\cdots\cdots+\cdots\cdots)$

6 1 If $(X+1)$ is a factor of the expression : $5X^2-2X-7$

, then find the second factor.

2 If $(2X-7)$ is a factor of the expression : $4X^2-8X-21$

, then find the second factor.

7 **Find the value of $c \in \mathbb{Z}$ such that the algebraic expression can be factorized , then factorize it :**

1 cX^2+X-15

2 $cX^2-13X+6$

Geometric Application

8 The area of a rectangle is $(2X^2+19X+35)$ cm^2. Find two possible dimensions of the rectangle in terms of X , then find its perimeter as $X=3$

For excellent pupils

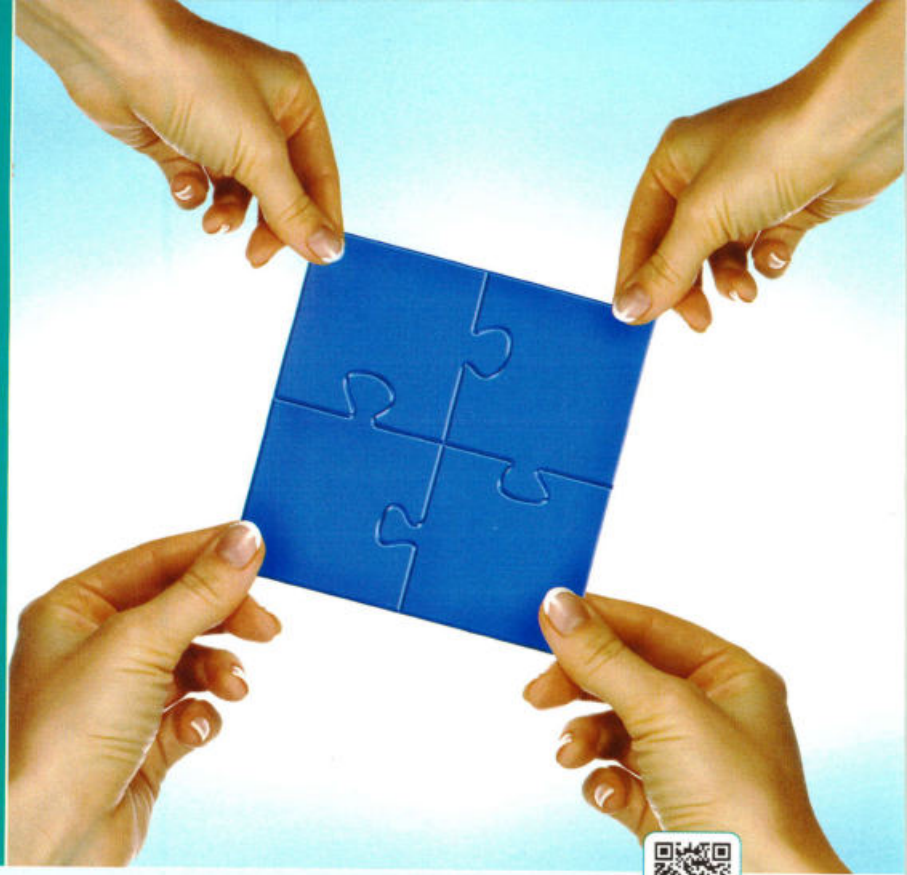
9 **Factorize each of the following :**

1 $3+11(a+b)-4(a+b)^2$

2 $3(2X+3y)^2-(2X+3y)(X-y)-2(X-y)^2$

Exercise **3**

Factorizing the perfect square trinomials



From the school book

● Remember ● Understand ○ Apply Problem Solving

Interactive test

1 **Show which of the following expressions is a perfect square trinomial :**

1. $a^2 + 9$
2. $a^2 - ab + b^2$
3. $x^2 - 12x + 36$
4. $25x^2 - 15x + 9$
5. $\ell^2 - 8\ell m + 16m^2$
6. $9x^2 + 15xy + 25y^2$
7. $4c^4 - 12c^2d - 9d^2$
8. $4 + 36a^3 + 81a^6$
9. $1 - 2a + a^2$
10. $4 - 6a + 8a^2$
11. $\frac{1}{4}y^2 - y + 4$
12. $0.01x^2 - 0.2x + 1$

2 **Factorize each of the following :**

1. $m^2 - 2m + 1$
2. $x^2 + 2xy + y^2$
3. $9x^2 + 12x + 4$
4. $25b^2 - 10b + 1$
5. $9a^2 + 6ab + b^2$
6. $4x^2 - 4xy + y^2$
7. $16a^2 - 40ab + 25b^2$
8. $1 + 14x + 49x^2$
9. $36 - 60k + 25k^2$
10. $1 - 10a^2 + 25a^4$

3 **Factorize each of the following :**

1. $18y^2 - 12y + 2$
2. $12x^2 + 36xy + 27y^2$
3. $24a^4 + 24a^2 + 6$
4. $6a^4 - 12a^2b^2 + 6b^4$

5 📖 $20\,a\,y^2 - 60\,a\,y + 45\,a$

6 📖 $24\,x + 24\,x^2 + 6\,x^3$

7 📖 $3\,z + 42\,z^4 + 147\,z^7$

8 📖 $4\,b^2c + bc^2 + 4\,b^3$

9 $60\,ab - 36\,a^2 - 25\,b^2$

10 📖 $(c - d) + 2\,x\,(c - d) + x^2\,(c - d)$

4 Factorize each of the following :

1 $\frac{1}{4}\,y^2 - 2\,y + 4$

2 $\frac{1}{16}\,a^2 + \frac{1}{10}\,a + \frac{1}{25}$

3 $\frac{4}{25}\,x^2 - \frac{1}{10}\,x + \frac{1}{64}$

4 📖 $0.01\,x^2 - 0.2\,x + 1$

5 Factorize each of the following :

1 $7\,x\,(7\,x - 10\,y) + 25\,y^2$

2 $4\,x^2 - 7\,y\,(4\,x - 7\,y)$

3 $m^2 - 11\,n\,(2\,m - 11\,n)$

4 $(x - y)^2 + 4\,x\,y$

6 Complete the missing term in each of the following trinomials to be a perfect square trinomial :

1 📖 $4\,x^2$ ..... $+ 1$

2 $4\,a^2$ ..... $+ 36\,b^2$

3 📖 $\frac{1}{25}\,x^2$ ..... $+ \frac{1}{4}\,y^2$

4 📖 z^4 ..... $+ 49\,\ell^2$

5 $a^2 - 6\,a +$ .....

6 $4\,x^2 + 28\,x +$ .....

7 📖 $a^2 - 6\,ab +$ .....

8 📖 $25\,m^2 + 20\,mn +$ .....

9 📖 ..... $- 18\,y^2 + 81$

10 ..... $- 24\,ab + 16\,b^2$

7 Choose the correct answer from those given :

1 📖 If $x^2 + k\,x + 25$ is a perfect square , then k = ...

(a) 5 (b) 10 (c) ± 10 (d) ± 5

2 The positive value of k which makes the expression : $36\,x^2 + k\,x + 1$ is a perfect square is .....

(a) 6 (b) ± 6 (c) 12 (d) ± 12

3 📖 If the expression : $x^2 + 14\,x + b$ is a perfect square , then b = ...

(a) 2 (b) 7 (c) 14 (d) 49

4 The expression : $a\,x^2 - 40\,x + 25$ is a perfect square when a = ...

(a) 2 (b) 4 (c) 9 (d) 16

5 If the expression : $c + 3x + \frac{1}{4}$ is a perfect square , then c = ...

(a) 9 (b) $\frac{9}{4}x^2$ (c) $9x^2$ (d) $4x^2$

6 If $x = 6$, $y = 4$, then $x^2 - 2xy + y^2$ = ...

(a) 2 (b) 4 (c) 10 (d) 100

7 If $a^2 + 2ab + b^2 = 25$, then a + b = ...

(a) 5 (b) – 5 (c) ± 5 (d) 12.5

8 Use factorization to get the value of each of the following easily :

1 $(87)^2 + 2 \times 13 \times 87 + (13)^2$

2 $(99)^2 - 2 \times 99 \times 98 + (98)^2$

3 $(7.3)^2 + 2 \times 7.3 \times 2.7 + (2.7)^2$

4 $(20.7)^2 - 1.4 \times 20.7 + (0.7)^2$

5 $(997)^2 + 6 \times 997 + 9$

6 $(99)^2 + 2 \times 99 + 1$

7 $25 - 2 \times 45 + 81$

Geometric Application

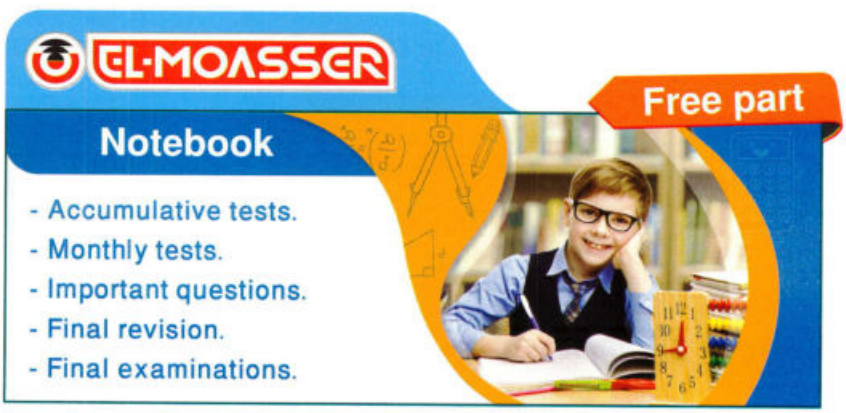
9 The area of a square is $(9x^2 + 30x + m)$ cm^2. Find the value of m (given that the side length of the square is a rational number) , then find its perimeter when $x = 2$

For excellent pupils

10 Factorize each of the following :

1 $y^2 + 2y(x + 1) + (x + 1)^2$

2 $(a + b)^2 - 4c^2(a + b) + 4c^4$



Exercise **4**

Factorizing the difference of two squares



From the school book

● Remember ● Understand ○ Apply Problem Solving

Interactive test

1 **Factorize each of the following :**

1 $x^2 - 4$

2 $a^2 - 25$

3 $16x^2 - 9$

4 $49y^2 - 1$

5 $x^2 - 4y^2$

6 $225x^2 - y^2$

7 $625a^2 - 81b^2$

8 $9 - y^2$

9 $-9x^2 + 25$

10 $a^2b^2 - 1$

11 $a^2 - b^2c^4$

12 $x^4 - 100$

13 $16a^6 - b^6$

14 $\frac{1}{9}y^2 - \frac{1}{16}$

15 $0.04x^2 - 0.25y^2$

2 **Factorize each of the following perfectly :**

1 $x^4 - 1$

2 $x^4 - 16y^4$

3 $x^{100} - 1$

3 **Factorize each of the following :**

1 $2x^2 - 32$

2 $x^3 - 25x$

3 $x^4 - x^2$

4 $8x^2 - 50$

5 $x^3y - xy^5$

6 $27x^3 - 48xy^6$

7 $\frac{1}{3}x^2 - 3$

8 $3x^2 - \frac{3}{16}$

9 $\frac{1}{2}x^2 - \frac{1}{18}y^2$

10 $4b^2(2a - b) - 25a^2(2a - b)$

4 **Factorize each of the following :**

1 $(a + b)^2 - 4$

2 $1 - (a - 1)^2$

3 $9\,a^2 - (2\,a + b)^2$

4 $a^2\,b^2 - (ab - 1)^2$

5 $(X + 1)^2 - (X - 1)^2$

6 $9\,(m - 1)^2 - 25\,(m + 1)^2$

7 $(X + y + 5)^2 - (X - y - 5)^2$

8 $(a - 2\,b)\,(a + 2\,b) - 5\,b^2$

5 **Use factorization to get the value of each of the following easily :**

1 $(77)^2 - (23)^2$

2 $(78)^2 - (77)^2$

3 $(11.6)^2 - (1.6)^2$

4 $(8.27)^2 - (1.73)^2$

5 $(95)^2 - 25$

6 $(999)^2 - 1$

7 $2 \times (25.87)^2 - 2 \times (24.13)^2$

6 **Using the idea of factorizing the difference between two squares , find the value of each of the following :**

1 31×29

2 103×97

7 If $X\,y = 8$, find the numerical value of the expression $(X + y)^2 - (X - y)^2$

8 **Simplify :** $(3\,a - 2\,b)^2 - (3\,a + 2\,b)^2 + 24\,ab$

9 **Complete the following :**

1 $(2\,X + \ldots\ldots)\,(\ldots\ldots - 3\,y) = 4\,X^2 - \ldots\ldots$

2 $(\ldots\ldots + 3\,m)\,(\ldots\ldots - 3\,m) = 25\,X^2 - \ldots\ldots$

3 $\ldots\ldots - 64\,X^2 = (4 - \ldots\ldots)\,(4 + \ldots\ldots)$

4 If $a - b = 2$, $a + b = 3$, then $a^2 - b^2 = \ldots\ldots$

5 If $X^2 - y^2 = 20$, $X + y = 10$, then $X - y = \ldots\ldots$

6 If $a^2 - b^2 = 45$, $a - b = 5$, then $\sqrt{a + b} = \ldots\ldots$

7 If $X^2 - y^2 = 24$, $X + y = 8$, then $3\,X - 3\,y = \ldots\ldots$

8 If $X^2 - y^2 = X + y$, then $X - y = \ldots\ldots$

9 If $2\,(a - b)\,(a + b) = 18$, then $a^2 - b^2 = \ldots\ldots$

10 If $a + b = 7\,(a - b) = 14$, then $a^2 - b^2 = \ldots\ldots$

10 Choose the correct answer from those given :

1 If $x^2 - a = (x - 3)(x + 3)$, then a = ...

(a) 3 (b) – 3 (c) 9 (d) – 9

2 If $x^2 + \ell - 4 = (x - 2)(x + 2)$, then ℓ = ...

(a) zero (b) 2 (c) 4 (d) 8

3 If $x + 2y = 3$, $x^2 - 4y^2 = 21$, then $x - 2y$ = ...

(a) 14 (b) 9 (c) 7 (d) 6

4 If $a - b = 7$, $a + b = 5$, then $2a^2 - 2b^2$ = ...

(a) 2 (b) 12 (c) 35 (d) 70

5 If $x^2 - y^2 = 16$, $y - x = 2$, then $x + y$ = ...

(a) 4 (b) 8 (c) – 8 (d) 2

6 If $a + b = 5$, $a - b = 4$, then $b^2 - a^2$ = ...

(a) – 20 (b) – 1 (c) 9 (d) 20

7 If $(25)^2 - (15)^2 = 10x$, then x = ...

(a) 40 (b) 30 (c) 20 (d) 10

8 $(x - y)(x + y)(x^4 - 2x^2y^2 + y^4)$ = ...

(a) $x^6 - y^6$ (b) $(x - y)^3 (x + y)^3$

(c) $(x^3 - y^3)(x^3 + y^3)$ (d) $(x^2 + y^2)(x^2 - y^2)$

Geometric Application

11 A right-angled triangle whose hypotenuse = 41 cm. long and the length of one side of the right angle is 40 cm. Use factorization to get the length of the second side of the right angle.

For excellent pupils

12 Factorize each of the following :

1 $(a^2 - 2ab + b^2) - c^2$ 2 $(2a + 3b)^3 - 8a^3 - 12a^2b$

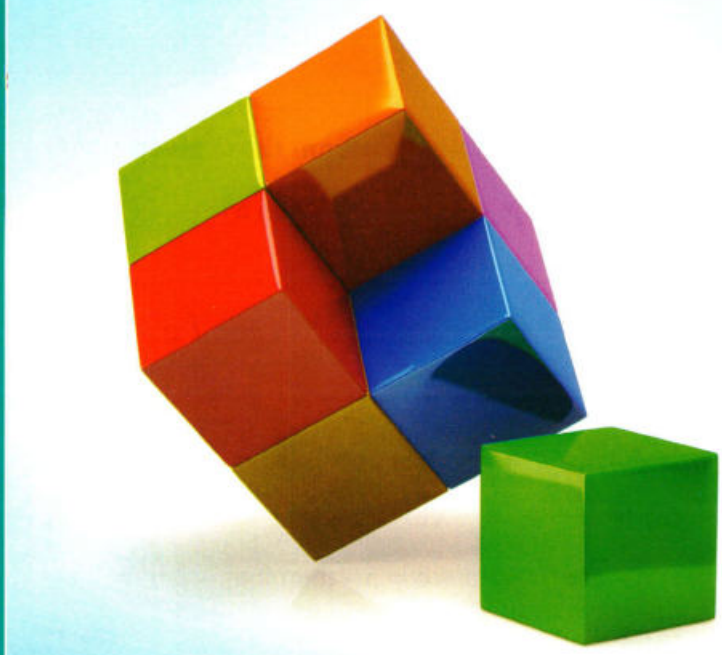
13 If $x > y$, $x^2 - 2xy + y^2 = 4$, $x + y = 8$,

find the numerical value of the expression : $x^2 - y^2$

Exercise **5**

Factorizing the sum and difference of two cubes

From the school book



Remember · Understand · Apply · Problem Solving

Interactive test

1 Factorize each of the following :

1 $x^3 + 8$	2 $x^3 - 1$	3 $64x^3 + 27$
4 $8x^3 - 125$	5 $125 + a^3$	6 $343 - 27m^3$
7 $m^3 + 64n^3$	8 $512x^3 - y^3$	9 $x^3y^3 + 27$
10 $27x^3y^3 - 64$	11 $\frac{1}{8}a^3 - 8b^3$	12 $\ell^3 - \frac{1}{125}$
13 $8a^3 + 0.001$	14 $0.027m^3 - n^3$	15 $1 + 125b^6$
16 $8x^3 - 343y^6$	17 $x^6 + y^6$	18 $x^6 - 64$

2 Factorize each of the following perfectly :

1 $2x^3 + 16$	2 $3x^3 - 81$	3 $\ell^4 + 64\ell$
4 $\ell^3 m - 27m^4$	5 $3x^4 + 3x$	6 $2x^5 - 54x^2$
7 $16x^3 + 250y^3$	8 $16a^3b + 686b^4$	9 $54x^4y^2 - 16xy^5$
10 $500x^8y^2 - 256x^5y^5$	11 $\frac{1}{2}x^3 + 4$	12 $\frac{1}{3}x^3 - 9$

3 Choose the correct answer from those given :

1 If $x + y = 3$, $x^2 - xy + y^2 = 5$, then $x^3 + y^3 =$ .....

(a) 15 (b) 25 (c) 8 (d) 7

2 If $x^3 - y^3 = 14$, $x^2 + xy + y^2 = 7$, then $x - y =$ .....

(a) 2 (b) 7 (c) 14 (d) – 2

3 If $x^3 + y^3 = 28$, $x + y = 2$, then $x^2 - xy + y^2 =$ .....

(a) 28 (b) 14 (c) 2 (d) 7

4 If $y^3 - a = (y - 2)(y^2 + 2y + 4)$, then a = ...

(a) 2 (b) 4 (c) 8 (d) – 8

5 If $X^3 - 8 = (X + a)(X^2 + 2X + 4)$, then a = ...

(a) 4 (b) – 4 (c) 2 (d) – 2

6 If $X^3 + 27 = (X + 3)(X^2 + k + 9)$, then k = ...

(a) – 6 X (b) – 3 X (c) 3 X (d) 6 X

7 If $X^3 - k^3 = (X - k)(X^2 + 4X + k^2)$, then k = ...

(a) 2 (b) 4 (c) 16 (d) 64

8 $(X - y)(X + y)(X^4 + X^2 y^2 + y^4)$ = ...

(a) $X^3 - y^3$ (b) $X^3 + y^3$ (c) $X^6 - y^6$ (d) $X^6 + y^6$

4 Complete the following to get true statements :

1 $X^3 - 1 = (X - 1)$ (.....)

2 $8a^3 + 125 =$ (..... + ...) $(4a^2 - 10a +$ .....)

3 $X^{12} + y^{15} =$ (..... + ...) (..... – ..... + ...)

4 $8a^3 -$ ..... = (..... – .....) (..... + ... + 9)

5 If $(X - 3)$ is a factor of the expression : $X^3 - 27$, then the other factor is .....

6 If $(4a^2 - 2a + 1)$ is a factor of the expression : $8a^3 + 1$, then the other factor is .....

5 If $X^2 - y^2 = 20$, $X - y = 2$, $X^2 - Xy + y^2 = 28$ Find the value of : $X^3 + y^3$

6 Factorize each of the following :

1 $(X + 5)^3 - 125$

2 $(m - 2n)^3 - 8n^3$

3 $2 - 2(X - 1)^3$

4 $(X + 5)^3 + (X - 5)^3$

5 $(X + y)^3 - (X - y)^3$

6 $(m - n) + (m - n)^4$

7 $(X^3 - 2)(X^3 + 2) - 4$

8 $(X - 3)(X^2 + 3X + 9) + 28$

7 Factorize each of the following :

1 $m^6 - 3m^3 + 2$

2 $X^6 - 7X^3 - 8$

For excellent pupils

8 Factorize perfectly : $(X + 5)^4 - X - 5$

9 If $Xy = 2$, $X - y = 1$, then find the value of : $X^3 - y^3$

Test 1

Total mark: 10

Answer the following questions :

1 Choose the correct answer from the given ones : (3 marks)

1 If $X - y = 5$, $X + y = 3$, then $X^2 - y^2 =$ .....

(a) 8 (b) 15 (c) 2 (d) $\frac{5}{3}$

2 Twice the square of the number X is .....

(a) $(2X)^2$ (b) $4X^2$ (c) $2X^2$ (d) $2X$

3 The expression : $X^2 - 5X + c$ is factorizable when c = ...

(a) 7 (b) 8 (c) – 3 (d) 6

---

2 Complete : (3 marks)

1 If $(X + 5)$ is a factor of the expression : $2X^2 + 13X + 15$, then the other factor is .....

2 If the expression : $9X^2 + kX + 25$ is a perfect square , then k = ...

3 The S.S. of the equation : $X(X + 1) = 0$ in $\mathbb{R}$ is .....

---

3 Factorize : (2 marks)

1 $X^3 - 8$ 2 $aX - 5X + 3a - 15$

---

4 A real number is added to its square and the result is 12 (2 marks)

What is the number ?

Test 2

Total mark: 10

Answer the following questions :

1 Choose the correct answer from the given ones : (3 marks)

1 The expression : a $x^2 + 24x + 9$ is a perfect square , then a = ...

(a) 25 (b) 8 (c) 16 (d) 4

2 The S.S. of the equation : $x^2 + 9 = 0$ in $\mathbb{R}$ is .....

(a) $\{3\}$ (b) $\{-3\}$ (c) $\{3, -3\}$ (d) $\varnothing$

3 If the age of Sameh 5 years ago was x years , then his age now is ..... years.

(a) $x - 5$ (b) $x + 5$ (c) $5 - x$ (d) $5x$

---

2 Complete : (3 marks)

1 If $x^2 + \ell - 9 = (x - 3)(x + 3)$, then ℓ = ...

2 If $x = 1$ is a root of the equation : $x^2 - 5x + 4 = 0$, then the other root is .....

3 If $a^3 + b^3 = 9$, $a^2 - ab + b^2 = 3$, then a + b = ...

---

3 Use the factorization to find : $(98)^2 - 4$ (2 marks)

---

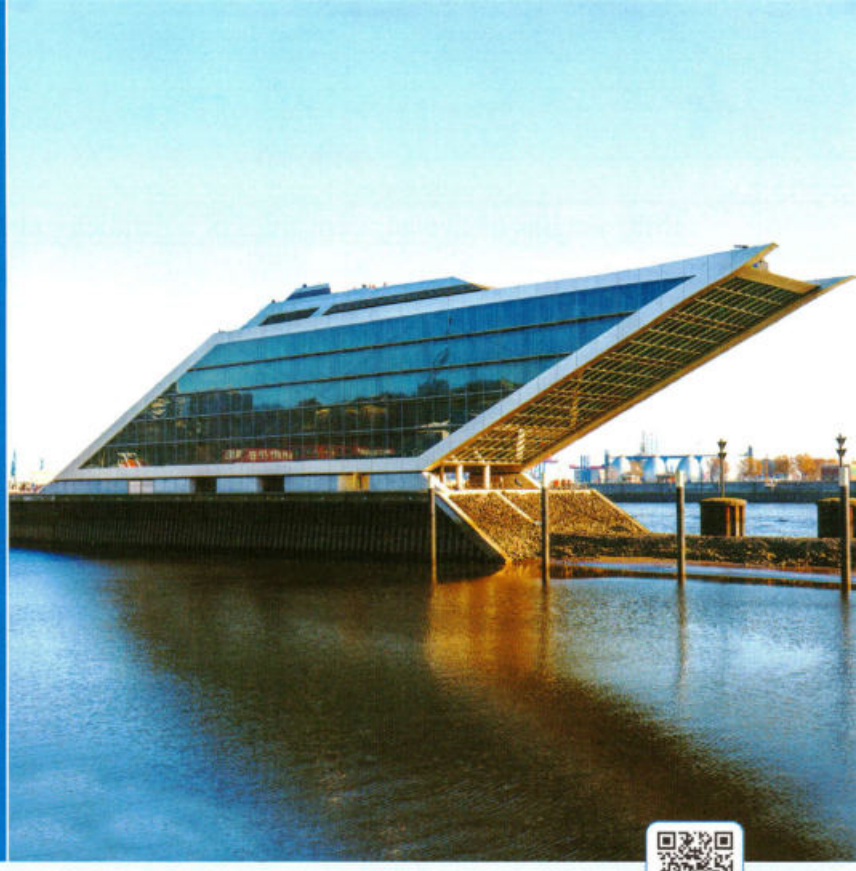
4 Factorize : (2 marks)

1 $3x^2 + 7x + 2$

2 $x^4 + 4y^4$

Exercise 1

Equality of the areas of two parallelograms



From the school book

● Remember ● Understand ○ Apply Problem Solving

Interactive test

1 Complete the following :

1 Surfaces of two parallelograms with common base and between two parallel straight lines , one is carrying this base , are .....

2 The parallelogram and ..... with common base and between two parallel straight lines are equal in area.

3 The area of the parallelogram = ... × .....

4 The areas of the parallelograms with bases equal in length and lying on a straight line , while the opposite sides to these bases are on another straight line , are .....

2 Choose the correct answer from those given :

1 If the base length of a parallelogram is 7 cm. and the corresponding height is 4 cm. , then its area equals .....

(a) 11 cm^2 (b) 14 cm^2 (c) 22 cm^2 (d) 28 cm^2

2 If the area of a parallelogram is 35 cm^2 and its height is 5 cm. , then the length of the corresponding base is .....

(a) 5 cm. (b) 7 cm. (c) 9 cm. (d) 30 cm.

3 If the area of a parallelogram is 50 cm^2 and its base length = 10 cm. , then the corresponding height of this base = ...

(a) 500 cm. (b) 5 cm. (c) 250 cm. (d) 100 cm.

4 If the lengths of two adjacent sides of a parallelogram are 8 cm. and 10 cm. and its greater height is 5 cm. , then its area equals .....

(a) 80 cm^2 (b) 50 cm^2 (c) 40 cm^2 (d) 18 cm^2

5 If ABCD is a parallelogram in which , AB = 5 cm. , BC = 10 cm. and its smaller height is 4 cm. , then its greater height equals .....

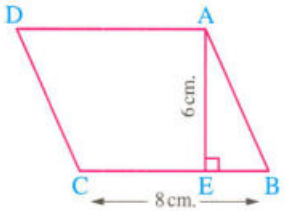
(a) 2 cm. (b) 4 cm. (c) 8 cm. (d) 10 cm.

6 A parallelogram whose area = 50 cm^2 and the length of its base equals twice the corresponding height , then this height equals .....

(a) 50 cm. (b) 25 cm. (c) 10 cm. (d) 5 cm.

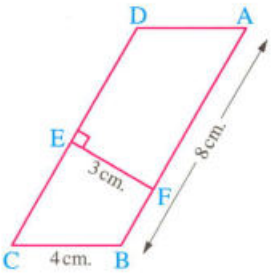
3 In each of the following , if ABCD is a parallelogram , complete the statements below each figure :

1



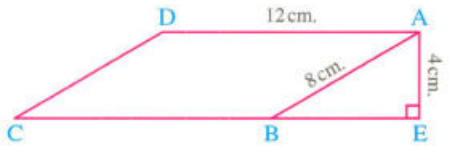
The area of ▱ ABCD = ... cm^2

2



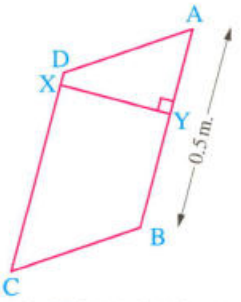
The area of ▱ ABCD = ... cm^2

3



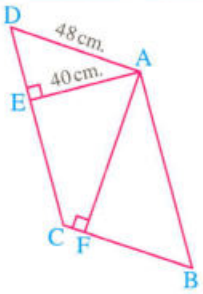
The area of ▱ ABCD = ... cm^2

4



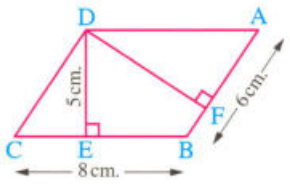
If the area of ▱ ABCD is 1.7 m^2 , then XY = ... m.

5



If the area of ▱ ABCD is 2400 cm^2 , then DC = ... cm. , AF = ... cm.

6



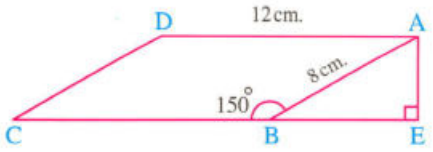
DF = ... cm.

4 **In the opposite figure :**

ABCD is a parallelogram in which m (∠ ABC) = 150° ,

AD = 12 cm. , AB = 8 cm.

, E ∈ $\overrightarrow{CB}$ and $\overline{AE} \perp \overrightarrow{CB}$

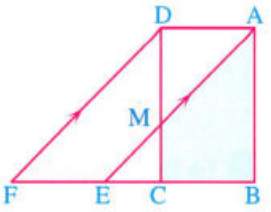


Find : The area of ▱ ABCD

« 48 cm^2 »

5 **In the opposite figure :**

ABCD is a rectangle , $\overline{AE}$ // $\overline{DF}$, E ∈ $\overrightarrow{BC}$ and F ∈ $\overrightarrow{BC}$



Prove that :

The area of the figure ABCM = the area of the figure DMEF

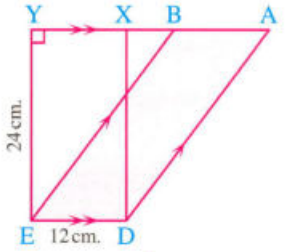
6 **In the opposite figure :**

$\overleftrightarrow{AB}$ // $\overleftrightarrow{DE}$, X ∈ $\overrightarrow{AB}$, Y ∈ $\overrightarrow{AB}$

, XDEY is a rectangle and $\overline{AD}$ // $\overline{BE}$

1 Find the area of the figure ABED

2 If AD = 30 cm. , find the length of the perpendicular from B to $\overline{AD}$

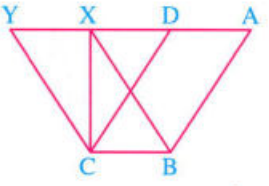


« 288 cm^2 , 9.6 cm. »

7 **In the opposite figure :**

ABCD and XBCY are two parallelograms , X ∈ $\overrightarrow{AD}$

and the area of Δ XCY = 15 cm^2



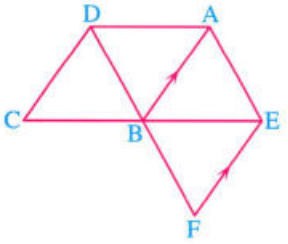
Find : The area of ▱ ABCD

« 30 cm^2 »

8 **In the opposite figure :**

ABCD and AEBD are two parallelograms and F ∈ $\overrightarrow{DB}$

such that $\overline{EF}$ // $\overline{AB}$



Prove that :

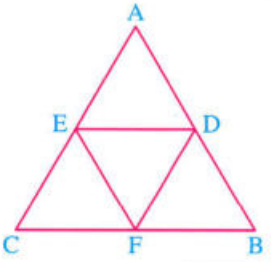
1 AEFB is a parallelogram.

2 The area of ▱ ABCD = the area of ▱ AEFB

9 **In the opposite figure :**

DBFE and DFCE are two parallelograms

and F ∈ $\overline{BC}$

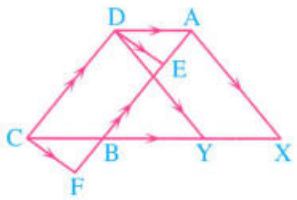


Prove that :

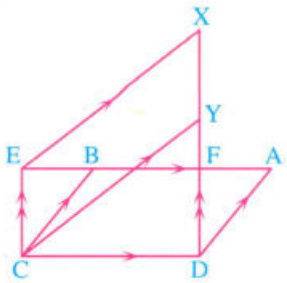
The area of the figure ABFE = the area of the figure ADFC

10 **In each of the following , show that all the three parallelograms have equal areas :**

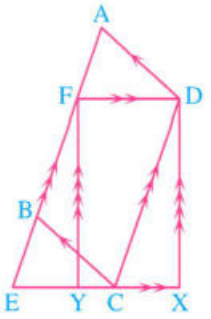
1



2



3

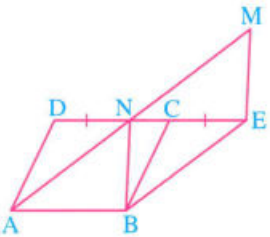


11 **In the opposite figure :**

ABCD and BEMN are two parallelograms and EC = DN

where $E \in \overrightarrow{DC}$ and $M \in \overrightarrow{AN}$

Prove that : The area of ▱ ABCD = the area of ▱ BEMN

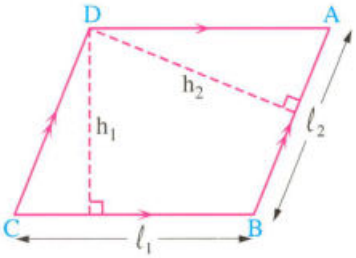


For excellent pupils

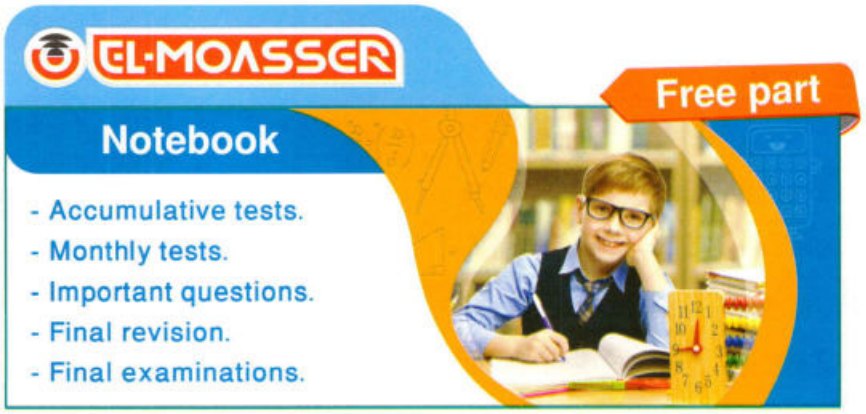
12 **In the opposite figure :**

ABCD is a parallelogram whose area is 240 cm^2.

$\ell_1 : h_1 = 5 : 3$, $\ell_1 : \ell_2 = 4 : 3$ **Find :** h_2



« 16 cm. »



Exercise **2**

Follow : Corollaries on theorem (1)

From the school book



Remember Understand Apply Problem Solving

Interactive test

1 Choose the correct answer from those given :

1 The area of the triangle is ..... the area of the parallelogram which has a common base with it and its vertex lies on the straight line parallel to this base.

(a) equal to (b) half (c) twice (d) quarter

2 The area of the triangle = ... the base length × the corresponding height.

(a) 2 (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) $\frac{1}{3}$

3 The ratio between the area of the parallelogram and the area of the triangle whose base is common and are included between two parallel straight lines = ...

(a) 1 : 2 (b) 1 : 3 (c) 2 : 1 (d) 2 : 3

4 If the base length of a triangle is 4 cm. and the corresponding height = 3 cm. , then its area = ...

(a) 6 cm^2 (b) 12 cm^2 (c) 24 cm. (d) 34 cm^2

5 The triangle whose base length is 12 cm. and its area is 48 cm^2 , the corresponding height = ...

(a) 3 cm. (b) 4 cm. (c) 6 cm. (d) 8 cm.

6 If the area of the triangle is 42 cm^2 and its height = 7 cm. , then the length of the corresponding base = ...

(a) 15 cm. (b) 12 cm. (c) 8 cm. (d) 4 cm.

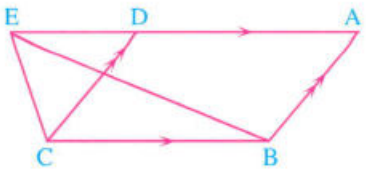
7 The area of a right-angled triangle in which the lengths of the sides of the right angle are 6 cm. and 9 cm. equals .....

(a) 54 cm^2 (b) 60 cm^2 (c) 27 cm^2 (d) 15 cm^2

8 If ABCD is a parallelogram with area 100 cm^2 and E $\in \overline{AD}$, then the area of Δ EBC = ...

(a) 25 cm^2 (b) 50 cm^2 (c) 100 cm^2 (d) 200 cm^2

2 In the opposite figure :



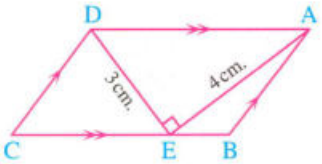
ABCD is a parallelogram and E $\in \overrightarrow{AD}$

Complete the following :

1 The area of Δ EBC = ... the area of $\square$ ABCD

2 If the area of Δ EBC = 20 cm^2 , then the area of $\square$ ABCD = ... cm^2

3 In the opposite figure :

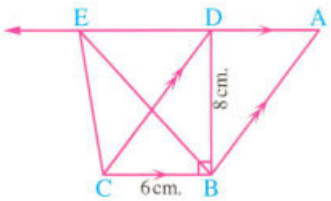


ABCD is a parallelogram , AE = 4 cm. , ED = 3 cm. , m ($\angle$ AED) = 90° and E $\in \overline{BC}$

Complete :

1 The area of Δ AED = ... cm^2 2 The area of $\square$ ABCD = ... cm^2

4 In the opposite figure :



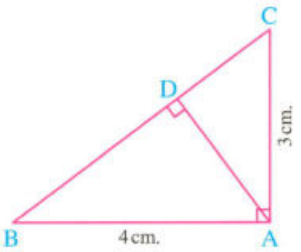
ABCD is a parallelogram in which , BC = 6 cm. , $\overline{DB} \perp \overline{BC}$, such that , DB = 8 cm. and E $\in \overrightarrow{AD}$

Complete :

1 The area of $\square$ ABCD = ... cm^2

2 The area of Δ EBC = ... cm^2

5 In the opposite figure :

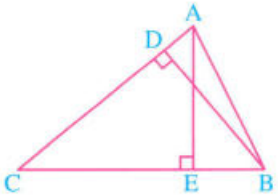


ABC is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$, AB = 4 cm. and AC = 3 cm.

Find : 1 The area of Δ ABC 2 The length of $\overline{AD}$

« 6 cm^2 , 2.4 cm. »

6 In the opposite figure :



ABC is a triangle in which BC = 6.5 cm. , AC = 6 cm. , $\overline{AE} \perp \overline{BC}$, $\overline{BD} \perp \overline{AC}$ and BD = 5 cm.

Find : 1 The area of Δ ABC 2 The length of $\overline{AE}$

« 15 cm^2 , $4\frac{8}{13}$ cm. »

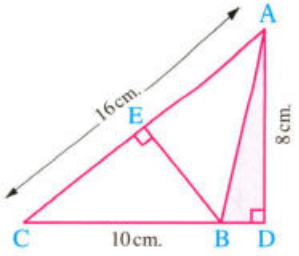
7 **In the opposite figure :**

$\overline{AD} \perp \overrightarrow{CB}$, $\overline{BE} \perp \overline{AC}$, AC = 16 cm. ,

BC = 10 cm. and AD = 8 cm.

Find :

1 The area of Δ ABC 2 The length of $\overline{BE}$

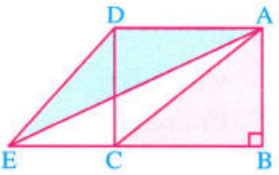


« 40 cm^2 , 5 cm. »

8 **In the opposite figure :**

ABCD is a rectangle and E $\in \overrightarrow{BC}$

Prove that : The area of Δ DAE = the area of Δ ABC



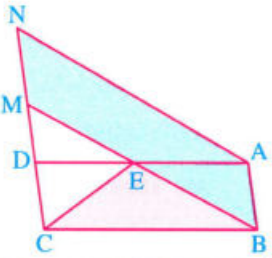
9 **In the opposite figure :**

ABCD and ABMN are two parallelograms

and M $\in \overrightarrow{CD}$

Prove that :

The area of Δ EBC = $\frac{1}{2}$ the area of ▱ ABMN



10 **In the opposite figure :**

ABCD is a rectangle , ABEF is a parallelogram

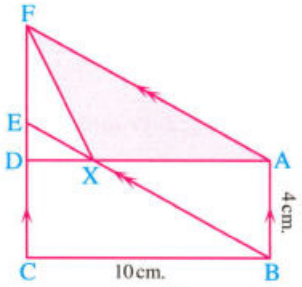
, D $\in \overline{CF}$, X $\in \overline{BE}$, E $\in \overline{CF}$

, AB = 4 cm. and BC = 10 cm.

Find by proof :

1 The area of ▱ ABEF

2 The area of Δ XAF



« 40 cm^2 , 20 cm^2 »

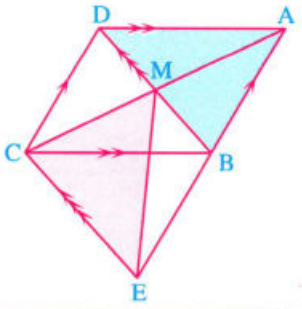
11 **In the opposite figure :**

ABCD and BECD are two parallelograms , where

$\overline{AC} \cap \overline{BD} = \{M\}$

Prove that :

The area of Δ ABD = the area of Δ MEC



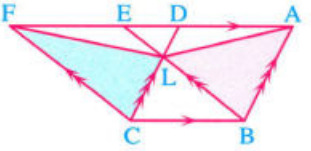
12 **In the opposite figure :**

ABCD and EBCF are two parallelograms , $\overline{BE} \cap \overline{CD} = \{L\}$

, D $\in \overline{AF}$ and E $\in \overline{AF}$

Prove that : 1 The area of Δ ABL = the area of Δ FCL

2 The area of the figure ABCL = the area of the figure FCBL

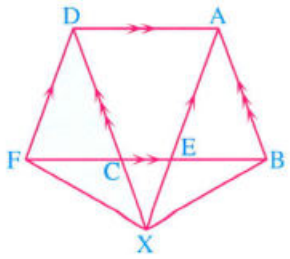


13 **In the opposite figure :**

ABCD and AEFD are two parallelograms and $\overrightarrow{AE} \cap \overrightarrow{DC} = \{X\}$

Prove that :

The area of Δ ABX = the area of Δ DFX

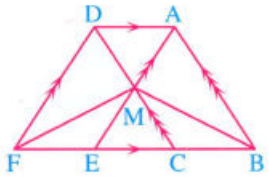


14 **In the opposite figure :**

ABCD and AEFD are two parallelograms and $\overline{AE} \cap \overline{CD} = \{M\}$ where $E \in \overline{BF}$ and $C \in \overline{BF}$

Prove that :

The area of Δ ABM = the area of Δ DMF

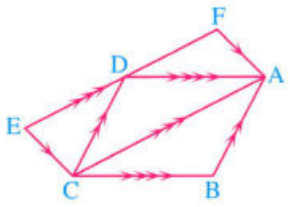


15 **In the opposite figure :**

ABCD and ACEF are two parallelograms and $D \in \overline{FE}$

Prove that :

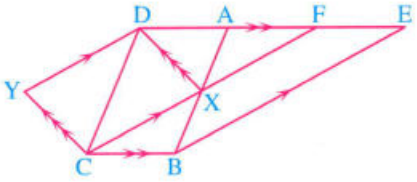
The area of $\square$ ABCD = the area of $\square$ ACEF



16 **In the opposite figure :**

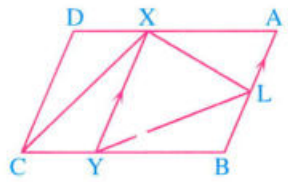
$\overleftrightarrow{ED} // \overleftrightarrow{BC}$, $\overleftrightarrow{XD} // \overleftrightarrow{CY}$,
$\overleftrightarrow{EB} // \overleftrightarrow{FC} // \overleftrightarrow{DY}$, $X \in \overline{FC}$
, $F \in \overline{ED}$ and $A \in \overline{ED}$

Prove that : The area of $\square$ EBCF = the area of $\square$ ABCD = the area of $\square$ DXCY

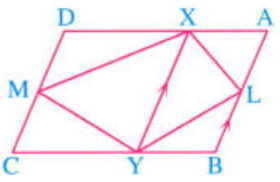


17 **In each of the following figures , $\overline{XY} // \overleftrightarrow{AB}$, show that the area of the coloured part is equal to half of the area of the parallelogram ABCD :**

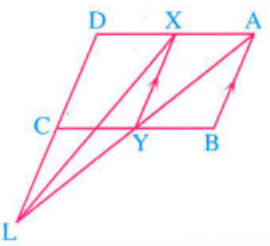
1



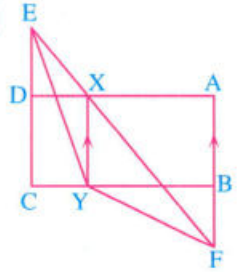
2



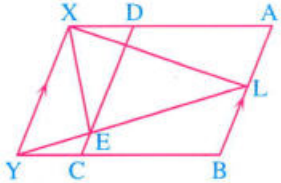
3



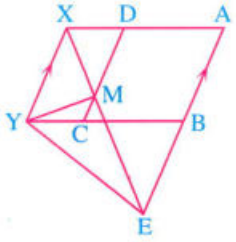
4



5



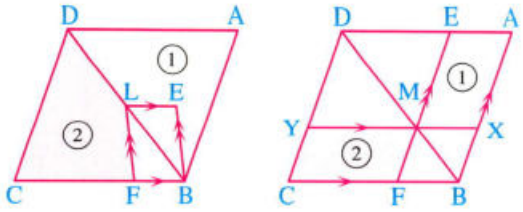
6



18 **In each of the opposite figures :**

ABCD is a parallelogram.

Why is the area of figure (1) equal to the area of figure (2) ?

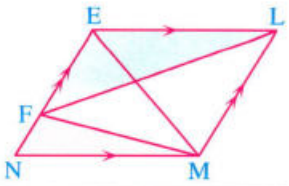


19 **In the opposite figure :**

LMNE is a parallelogram.

Prove that :

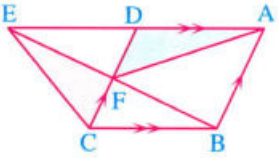
The area of Δ LEF + the area of Δ MFN = the area of Δ LEM



20 **In the opposite figure :**

ABCD is a parallelogram , $E \in \overrightarrow{AD}$ and $\overline{BE} \cap \overline{CD} = \{F\}$

Prove that : The area of Δ AFD = the area of Δ EFC

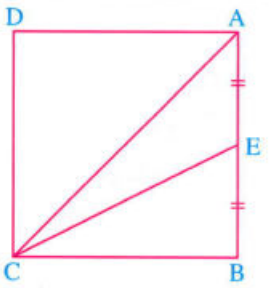


21 **In the opposite figure :**

ABCD is a square , E is the midpoint of $\overline{AB}$

The perimeter of the square ABCD = 48 cm.

Find : The area of Δ AEC



« 36 cm^2 »

22 **In the opposite figure :**

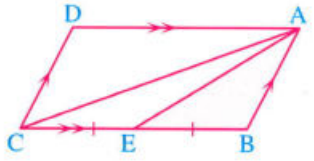
ABCD is a parallelogram whose perimeter is 48 cm. ,

BC = 2 AB and the area of Δ ABC = 56 cm^2 ,

E is the midpoint of $\overline{BC}$

Find : 1 The two heights of ▱ ABCD

2 The area of Δ AEC



« 14 cm. , 7 cm. , 28 cm^2 »

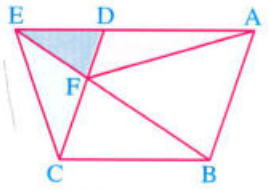
For excellent pupils

23 **In the opposite figure :**

ABCD is a parallelogram , $F \in \overline{CD}$ and $\overrightarrow{BF} \cap \overrightarrow{AD} = \{E\}$

Prove that :

The area of Δ AFE = the area of Δ DCE



24 Δ ABC is right-angled at B , m (∠ C) = 30° , $\overrightarrow{BD} \perp \overline{AC}$ intersecting it at D

Prove that : $BD = \frac{2\,AD \times BC}{AC}$

Exercise **3**

Equality of the areas of two triangles



From the school book

● Remember ● Understand ○ Apply Problem Solving

Interactive test

1 Complete the following :

1 The two triangles drawn on a common base and their vertices located on a straight line parallel to the base are .....

2 Triangles with congruent bases and drawn between two parallel lines are .....

3 The median in the triangle divides its surface into .....

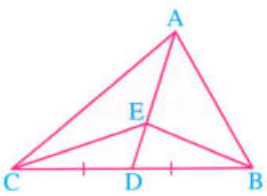
4 If ABC is a triangle , D is the midpoint of $\overline{BC}$, then :
The area of Δ ABD = the area of Δ .....

5 If $\overline{XL}$ is a median in Δ XYZ , then the area of Δ XYZ = ... the area of Δ XYL

6 The triangle XYZ in which $L \in \overline{YZ}$ such that $YL = \frac{1}{2} LZ$, then :
The area of Δ XYL = ... the area of Δ XYZ

2 In the opposite figure :

ABC is a triangle with a median $\overline{AD}$,
$E \in \overline{AD}$, draw $\overline{BE}$ and $\overline{CE}$



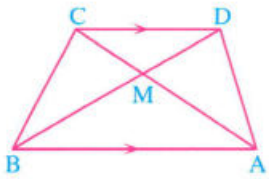
Prove that : The area of Δ ABE = the area of Δ ACE

Complete :

∵ $\overline{AD}$ is a median in the triangle .....
∴ The area of Δ ABD = the area of ..... (1)
∵ ..... is a median in Δ EBC
∴ The area of Δ EBD = the area of ..... (2)
Subtracting sides of (2) from sides of (1) , then the area of Δ ABE = ... (Q.E.D.)

3 **In the opposite figure :**

$\overleftrightarrow{AB} // \overleftrightarrow{DC}$ and $\overline{AC} \cap \overline{BD} = \{M\}$



Complete and justify each step of your answer :

1 The area of Δ ADB = the area of ..... because .....

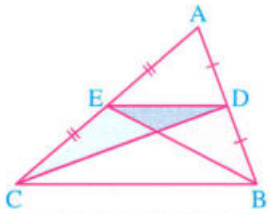
2 The area of Δ DAC = the area of ..... because .....

3 The area of Δ DAM = the area of ..... because .....

---

4 **In the opposite figure :**

D is the midpoint of $\overline{AB}$ and E is the midpoint of $\overline{AC}$



Prove that :

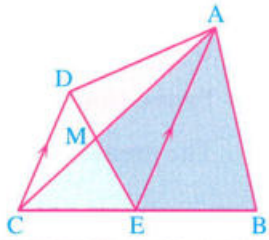
The area of Δ BDE = the area of Δ CDE

---

5 **In the opposite figure :**

ABCD is a quadrilateral. $E \in \overline{BC}$ such that $\overline{AE} // \overline{DC}$,

$\overline{AC} \cap \overline{DE} = \{M\}$



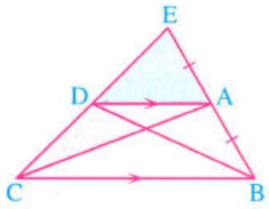
Prove that : The area of Δ ABC = the area of the figure ABED

---

6 **In the opposite figure :**

ABCD is a quadrilateral in which $\overline{AD} // \overline{BC}$ and $\overrightarrow{BA} \cap \overrightarrow{CD} = \{E\}$

such that BA = AE

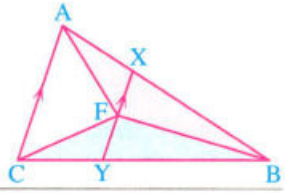


Prove that : The area of Δ ADC = the area of Δ ADE

---

7 **In the opposite figure :**

$\overline{AC} // \overline{XY}$ and F is the midpoint of $\overline{XY}$



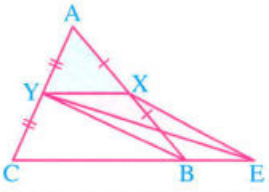
Prove that : The area of Δ ABF = the area of Δ CBF

---

8 **In the opposite figure :**

ABC is a triangle. X is the midpoint of $\overline{AB}$,

Y is the midpoint of $\overline{AC}$ and $E \in \overrightarrow{CB}$



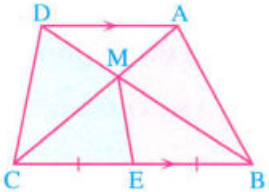
Prove that : The area of Δ XYE = the area of Δ AXY

---

9 **In the opposite figure :**

$\overline{AD} // \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$,

E is the midpoint of $\overline{BC}$



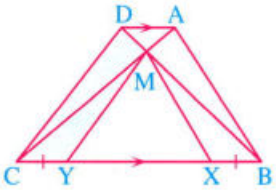
Prove that : The area of the figure ABEM = the area of the figure DMEC

10 **In the opposite figure :**

$\overline{AD} // \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$ and BX = CY

Prove that :

The area of the figure ABXM = the area of the figure DCYM

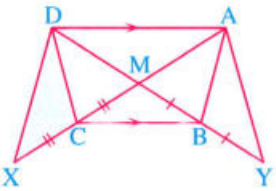


11 **In the opposite figure :**

$\overline{AD} // \overline{BC}$ and B is the midpoint of $\overline{YM}$,

C is the midpoint of $\overline{MX}$

Prove that : The area of Δ AYB = the area of Δ DCX



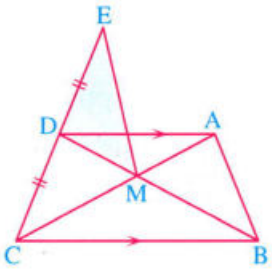
12 **In the opposite figure :**

$\overline{AD} // \overline{BC}$ and $\overline{AC} \cap \overline{BD} = \{M\}$,

D is the midpoint of $\overline{EC}$

Prove that :

The area of Δ MDE = the area of Δ AMB



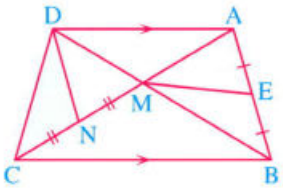
13 **In the opposite figure :**

ABCD is a quadrilateral whose diagonals intersect at M,

$\overline{AD} // \overline{BC}$ and E is the midpoint of $\overline{AB}$,

N is the midpoint of $\overline{MC}$

Prove that : The area of Δ AEM = the area of Δ DNC

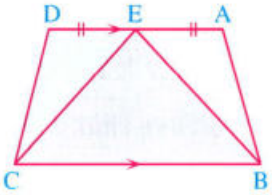


14 **In the opposite figure :**

$\overline{AD} // \overline{BC}$ and E is the midpoint of $\overline{AD}$

Prove that :

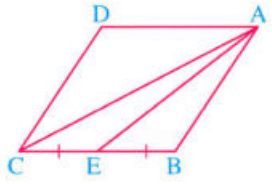
The area of the figure ABCE = the area of the figure DEBC



15 **In the opposite figure :**

ABCD is a parallelogram. E is the midpoint of $\overline{BC}$

Prove that : The area of Δ ABE = $\frac{1}{4}$ the area of ▱ ABCD

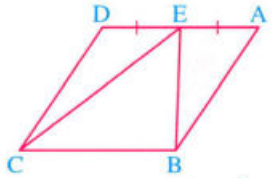


16 **In the opposite figure :**

ABCD is a parallelogram. E is the midpoint of $\overline{AD}$

The area of ▱ ABCD = 48 cm^2

Find : The area of Δ ABE



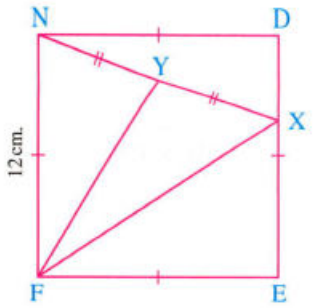
« 12 cm^2 »

17 **In the opposite figure :**

DEFN is a square whose side length is 12 cm.,

$X \in \overline{DE}$ and Y is the midpoint of $\overline{XN}$

Find : The area of Δ XYF



« 36 cm^2 »

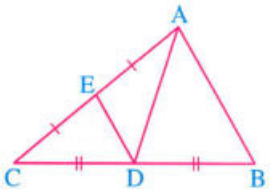
18 **In the opposite figure :**

D is the midpoint of $\overline{BC}$,

E is the midpoint of $\overline{AC}$,

the area of Δ DEC = 5 cm^2

Calculate : The area of Δ ABC



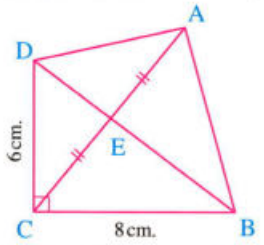
« 20 cm^2 »

19 **In the opposite figure :**

ABCD is a quadrilateral in which m ($\angle$ C) = 90° , BC = 8 cm.

, DC = 6 cm. , E is the midpoint of $\overline{AC}$

Prove that : The area of the figure ABCD = 48 cm^2



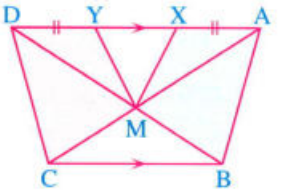
20 **In the opposite figure :**

ABCD is a quadrilateral whose diagonals intersect at M ,

$\overline{AD}$ // $\overline{BC}$, $X \in \overline{AD}$ and $Y \in \overline{AD}$

such that : AX = DY

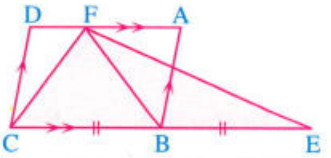
Prove that : The area of the figure ABMX = the area of the figure DCMY



21 **In the opposite figure :**

ABCD is a parallelogram. $E \in \overrightarrow{CB}$, where BC = BE

Prove that : The area of Δ FEC = the area of $\square$ ABCD

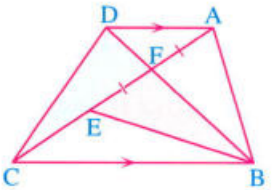


22 **In the opposite figure :**

$\overline{AD}$ // $\overline{BC}$, $F \in \overline{AC}$ and $E \in \overline{AC}$

such that : AF = FE

Prove that : The area of Δ BFE = the area of Δ DFC

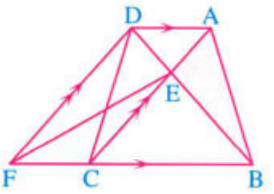


23 **In the opposite figure :**

$\overline{AD}$ // $\overline{BC}$, $\overline{DF}$ // $\overline{EC}$ and $\overline{AC} \cap \overline{BD} = \{E\}$,

$\overline{DF} \cap \overrightarrow{BC} = \{F\}$

Prove that : The area of Δ ABE = the area of Δ ECF

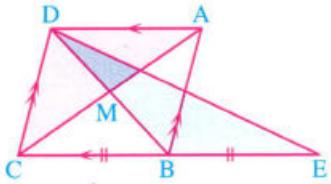


24 **In the opposite figure :**

ABCD is a parallelogram. Its diagonals intersect at M

and B is the midpoint of $\overline{EC}$

Prove that : The area of Δ EBD = the area of Δ ACD



25 **In the opposite figure :**

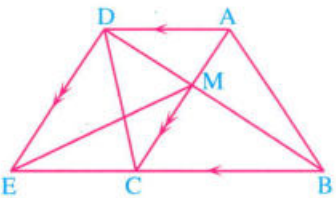
$\overleftrightarrow{AD}$ // $\overleftrightarrow{BC}$, E ∈ $\overleftrightarrow{BC}$ and $\overleftrightarrow{AC}$ // $\overleftrightarrow{DE}$,

$\overline{AC} \cap \overline{BD} = \{M\}$

Prove that :

1 The area of Δ ABM = the area of Δ DCM = the area of Δ EMC

2 The area of Δ DBC = the area of Δ EBM

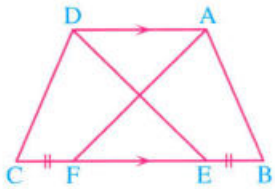


26 **In the opposite figure :**

$\overline{AD}$ // $\overline{BC}$ and BE = CF

Prove that :

The area of the figure ABED = the area of the figure AFCD



27 **In the opposite figure :**

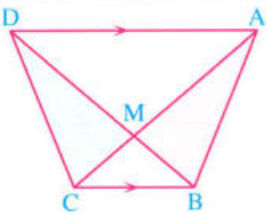
$\overline{AD}$ // $\overline{BC}$ **Prove that :** The area of Δ ABM = the area of Δ DMC

and if the area of Δ MBC = 20 cm^2 ,

the area of Δ ABM = 3 times the area of Δ MBC

Calculate : The area of the rectangle drawn on $\overline{BC}$ such that its other base is on $\overleftrightarrow{AD}$

« 160 $cm.^2$ »



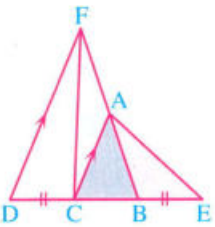
For excellent pupils

28 **In the opposite figure :**

ABC is a triangle. D ∈ $\overleftrightarrow{BC}$ and E ∈ $\overleftrightarrow{BC}$ such that BE = CD ,

$\overleftrightarrow{DF}$ // $\overline{CA}$ and intersects $\overrightarrow{BA}$ at F

Prove that : The area of Δ FBC = the area of Δ ACE

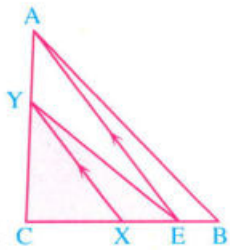


29 **In the opposite figure :**

ABC is a triangle in which X is the midpoint of $\overline{BC}$ and E ∈ $\overline{BX}$

Draw $\overleftrightarrow{XY}$ // $\overline{EA}$ to cut $\overline{AC}$ at Y

Prove that : The area of Δ EYC = $\frac{1}{2}$ the area of Δ ABC



Exercise **4**

Follow : Equality of the areas of two triangles



From the school book

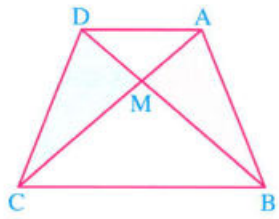
Remember Understand Apply Problem Solving

1 **In the opposite figure :**

ABCD is a quadrilateral , its diagonals intersect at M

and the area of Δ ABM = the area of Δ DCM

Prove that : $\overline{AD} \parallel \overline{BC}$

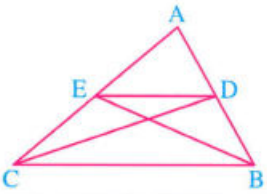


2 **In the opposite figure :**

ABC is a triangle in which $D \in \overline{AB}$ and $E \in \overline{AC}$

such that the area of Δ ABE = the area of Δ ACD

Prove that : $\overline{DE} \parallel \overline{BC}$



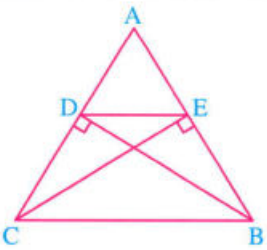
3 **In the opposite figure :**

$AB = AC$, $\overline{BD} \perp \overline{AC}$ and $\overline{CE} \perp \overline{AB}$

Prove that :

1 $\overline{ED} \parallel \overline{BC}$

2 The area of Δ ADB = the area of Δ AEC



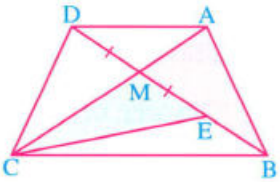
4 **In the opposite figure :**

ABCD is a quadrilateral whose diagonals are intersecting at M

and $E \in \overline{BM}$, where ME = MD

The area of Δ AMB = the area of Δ CME

Prove that : $\overline{AD} \parallel \overline{BC}$



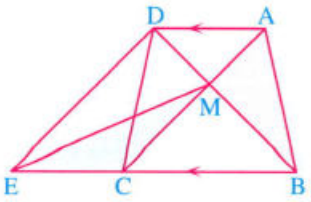
5 **In the opposite figure :**

ABCD is a quadrilateral in which $\overline{AD} \parallel \overline{BC}$

, $E \in \overrightarrow{BC}$ and $\overline{AC} \cap \overline{BD} = \{M\}$

The area of ΔABM = the area of ΔECM

Prove that : $\overline{DE} \parallel \overleftrightarrow{AC}$

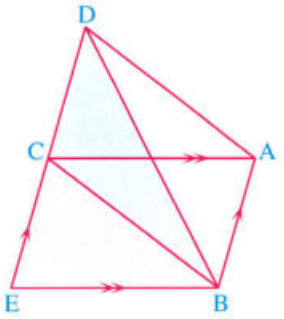


6 **In the opposite figure :**

ABEC is a parallelogram.

$D \in \overrightarrow{EC}$ such that the area of ΔDBC = the area of ΔEBC

Prove that : $\overline{AD} \parallel \overline{BC}$

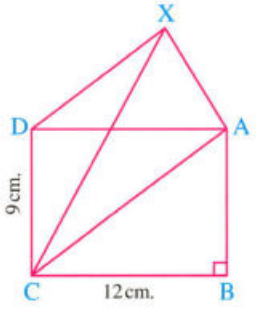


7 **In the opposite figure :**

ABCD is a rectangle. BC = 12 cm., CD = 9 cm.

and the area of $\Delta XAC = 54\ cm^2$

Prove that : $\overline{XD} \parallel \overline{AC}$

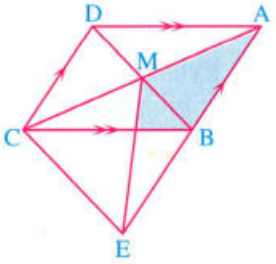


8 **In the opposite figure :**

ABCD is a parallelogram , $\overline{AC} \cap \overline{BD} = \{M\}$

and $E \in \overrightarrow{AB}$, where the area of ΔAME = the area of ΔABC

Prove that : The figure BECD is a parallelogram.



9 **In the opposite figure :**

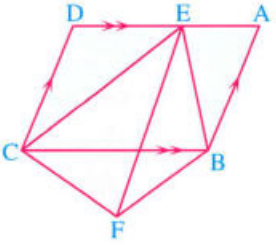
ABCD is a parallelogram. $E \in \overline{AD}$

and F is a point outside the parallelogram.

Draw $\overline{FC}$, $\overline{FE}$ and $\overline{FB}$ such that :

The area of ΔFCE = the area of ΔEAB + the area of ΔECD

Prove that : $\overline{BF} \parallel \overline{EC}$

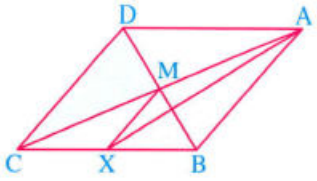


10 **In the opposite figure :**

ABCD is a parallelogram.

The area of Δ ABX = the area of Δ DMC

Prove that : $\overline{MX} \parallel \overline{AB}$



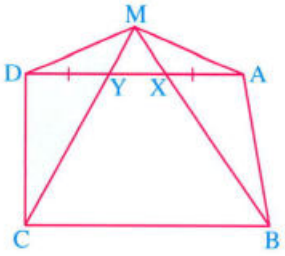
11 **In the opposite figure :**

ABCD is a quadrilateral.

$X \in \overline{AD}$ and $Y \in \overline{AD}$ such that AX = YD

The area of Δ ABM = the area of Δ DCM

Prove that : $\overline{AD} \parallel \overline{BC}$

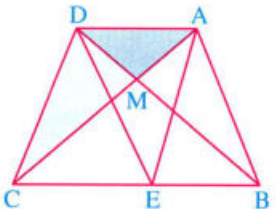


12 **In the opposite figure :**

ABCD is a quadrilateral.

The area of Δ ABD = the area of Δ ACD

Prove that : The area of Δ AED = the area of Δ ACD

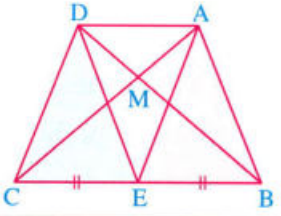


13 **In the opposite figure :**

E is the midpoint of $\overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$

The area of Δ ABE = the area of Δ DEC

Prove that : The area of Δ AMB = the area of Δ DMC

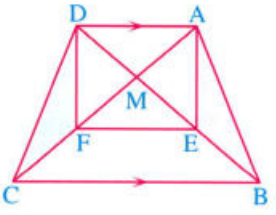


14 **In the opposite figure :**

If $\overline{AD} \parallel \overline{BC}$

and the area of Δ ABE = the area of Δ DFC

Prove that : $\overline{EF} \parallel \overline{BC}$



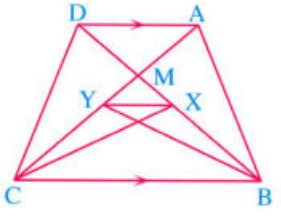
15 **In the opposite figure :**

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$,

$\overline{CX}$ is a median in Δ CBD

and $\overline{BY}$ is a median in Δ BAC

Prove that : $\overline{XY} \parallel \overline{BC}$



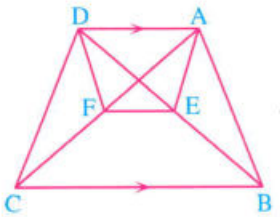
16 **In the opposite figure :**

ABCD is a quadrilateral in which

$\overline{AD}$ // $\overline{BC}$, E is the midpoint of $\overline{BD}$

and F is the midpoint of $\overline{AC}$

Prove that : $\overline{EF}$ // $\overline{BC}$



17 **In the opposite figure :**

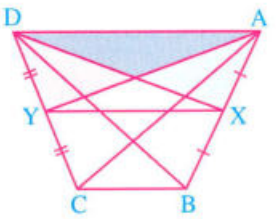
ABCD is a quadrilateral.

$\overline{DX}$ is a median in Δ DAB ,

$\overline{AY}$ is a median in Δ ACD

The area of Δ XAD = the area of Δ YAD

Prove that : $\overline{AD}$ // $\overline{BC}$ // $\overline{XY}$



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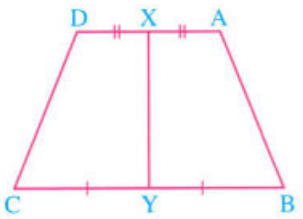
18 **In the opposite figure :**

ABCD is a quadrilateral. X is the midpoint of $\overline{AD}$

and Y is the midpoint of $\overline{BC}$ such that :

The area of the figure ABYX = the area of the figure DCYX

Prove that : $\overline{AD}$ // $\overline{BC}$



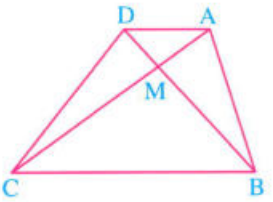
19 **In the opposite figure :**

ABCD is a quadrilateral.

M is the point of intersection of its diagonals.

If AM = $\frac{1}{2}$ MC and DM = $\frac{1}{2}$ MB

Prove that : $\overline{AD}$ // $\overline{BC}$



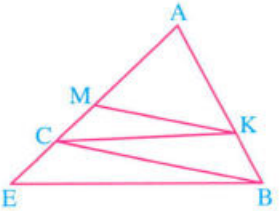
20 **In the opposite figure :**

ABC is a triangle.

K ∈ $\overline{AB}$, E ∈ $\overrightarrow{AC}$ and M is the midpoint of $\overline{AE}$,

the area of Δ ABC = twice the area of Δ AKM

Prove that : $\overline{KC}$ // $\overline{BE}$



Test 1

Total mark: 10

Answer the following questions :

1 Choose the correct answer from the given ones : (3 Marks)

1 The area of the rhombus of diagonal lengths 6 cm. , 8 cm. is ..... cm^2

(a) 48 (b) 14 (c) 24 (d) 28

2 The area of a rectangle is 40 cm^2 and its length 8 cm. , then its width ..... cm.

(a) 32 (b) 5 (c) 48 (d) 320

3 If the lengths of two adjacent sides of a parallelogram are 10 cm. , 8 cm. and the smaller height 4 cm. , then its area equals ..... cm^2

(a) 32 (b) 40 (c) 5 (d) 36

2 Complete : (3 Marks)

1 Surfaces of two parallelograms with common base and between two parallel straight lines , one is carrying this base are .....

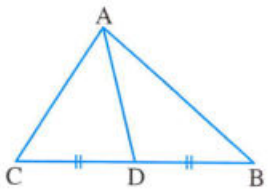
2 A square of area 50 cm^2 , then its diagonal length equal ..... cm.

3 **In the opposite figure :**

In Δ ABC : D is the midpoint of $\overline{BC}$

, the area of Δ ABD = 10 cm^2

, then the area of Δ ABC = ... cm^2



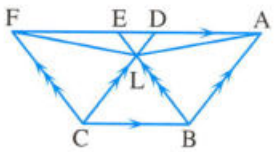
3 In the opposite figure : (2 Marks)

ABCD , EBCF are two parallelograms

, $\overline{BE} \cap \overline{CD} = \{L\}$, $D \in \overline{AF}$

, $E \in \overline{AF}$

Prove that : The area of Δ ABL = the area of Δ FCL



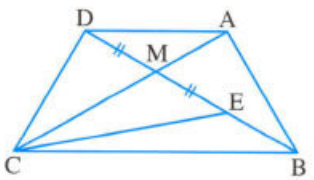
4 In the opposite figure : (2 Marks)

ABCD is a quadrilateral , its diagonals intersect at M

, $E \in \overline{BM}$ where ME = MD

, the area of Δ AMB = the area of Δ CME

Prove that : $\overline{AD} // \overline{BC}$



Test 2

Total mark: 10

Answer the following questions :

1 Choose the correct answer from the given ones : (3 Marks)

1 The area of triangle = ... of the length of the base × its corresponding height.

(a) $\frac{1}{4}$ (b) $\frac{1}{3}$ (c) twice (d) $\frac{1}{2}$

2 If the lengths of the two parallel bases of a trapezium are 15 cm. , 11 cm. , then the length of its middle base is ..... cm.

(a) 4 (b) 26 (c) 13 (d) 12

3 The ratio between the area of the triangle and the area of the parallelogram which have a common base and between two parallel straight lines is .....

(a) 1 : 3 (b) 2 : 4 (c) 2 : 1 (d) 1 : 1

2 Complete : (3 Marks)

1 The area of the parallelogram = ... × .....

2 If ABCD is a parallelogram of area 100 cm^2 , $E \in \overline{AD}$, then the area of Δ EBC = ...

3 A rhombus of area 30 cm^2 and side length 6 cm. , then its height equals ..... cm.

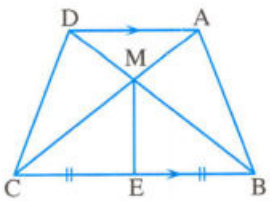
3 In the opposite figure : (2 Marks)

$\overline{AD} // \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, E is the midpoint of $\overline{BC}$

Prove that :

The area of the figure ABEM = the area of the figure DCEM



4 In the opposite figure : (2 Marks)

ABCD is a rectangle , ABEF is a parallelogram

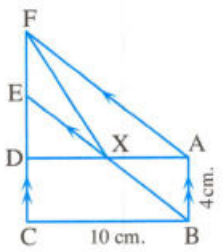
, $D \in \overline{CF}$, $E \in \overline{CF}$, $X \in \overline{BE}$

, AB = 4 cm. , BC = 10 cm.

Find :

1 Area of $\square$ ABEF

2 Area of Δ XAF



Test 1

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If $x^2 + k x + 36$ is a perfect square , then k = ...

(a) ± 6 (b) ± 8 (c) ± 12 (d) ± 18

2 If the expression : $x^2 + k x + 2$ can be factorized , then k may be equal to .....

(a) 3 (b) -1 (c) 1 (d) 0

3 If $(2x + 3)$ is a factor of the expression : $2x^2 - x - 6$, then the second factor is .....

(a) $x - 6$ (b) $x - 2$ (c) $x + 6$ (d) $x + 2$

2 Factorize each of the following : (2 marks)

(a) $2x^3 - 8x$

(b) $x^3 + 8$

Test 2

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If $x^2 - y^2 = 12$, $x + y = 3$, then $x - y$ = ...

(a) $\sqrt{3}$ (b) 4 (c) 36 (d) ± 2

2 If the expression : $a x^2 + 36x + 81$ is a perfect square , then a = ...

(a) 2 (b) 4 (c) 8 (d) 16

3 If $x^2 + a = (x - 5)(x + 5)$, then a = ...

(a) 5 (b) 25 (c) -25 (d) ± 25

2 Factorize each of the following : (2 marks)

(a) $2x^2 - 5x + 2$

(b) $4x^2 - 25y^2$

Test 3

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If $a^2 + 2ab + b^2 = 25$, then $a + b =$ .....

ⓐ -5 ⓑ 5 ⓒ ± 5 ⓓ 6

2 If $2x^2 - 5x + a = (2x - 3)(x - 1)$, then $a =$ .....

ⓐ 2 ⓑ 3 ⓒ -3 ⓓ 5

3 If $(x + y)^2 = 36$, $xy = 9$, then $x^2 + y^2 =$ .....

ⓐ 4 ⓑ 27 ⓒ 18 ⓓ 45

2 Use factorization to get the value of each of the following : (2 marks)

(a) $(87)^2 + 2 \times 13 \times 87 + (13)^2$

(b) $(78)^2 - (77)^2$

Test 4

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If $x + y = 4$, $x - y = 2$, then $x^2 - y^2 =$ .....

ⓐ 2 ⓑ 4 ⓒ 6 ⓓ 8

2 If $(x + 8)$ is a factor of the expression : $x^2 + 6x - 16$, then the other factor is .....

ⓐ $x - 2$ ⓑ $x - 4$ ⓒ $x + 2$ ⓓ $x + 4$

3 If the expression : $x^2 + 14x + b$ is a perfect square , then $b =$ .....

ⓐ 2 ⓑ 7 ⓒ 14 ⓓ 49

2 The area of a rectangle is $(2x^2 + 19x + 35)$ cm.^{2} (2 marks)

Find two possible dimensions of the rectangle in terms of x , then find its perimeter as $x = 3$

Test 5

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If $a^2 - b^2 = 20$, $a + b = 5$, then $a^2 - 2ab + b^2 =$ .....

ⓐ 4 ⓑ 5 ⓒ 20 ⓓ 16

2 If the expression : $x^2 + bx - 10$ can be factorized , then b may be equal to .....

ⓐ 3 ⓑ 2 ⓒ 1 ⓓ -1

3 If $x^3 + 27 = (x + 3)(x^2 + k + 9)$, then k = ...

ⓐ $-6x$ ⓑ $-3x$ ⓒ $3x$ ⓓ $6x$

2 Factorize each of the following : (2 marks)

(a) $3x^2 - 15x + 12$

(b) $\frac{1}{2}x^3 - 4$

Test 1

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If the area of the triangle is 24 cm^2 and its height is 8 cm. , then the length of the corresponding base equals .....

ⓐ 16 cm. ⓑ 6 cm. ⓒ 3 cm. ⓓ 2 cm.

2 If the lengths of two adjacent sides of a parallelogram are 8 cm. and 10 cm. and its greater height is 5 cm. , then its area = ...

ⓐ 80 cm^2 ⓑ 50 cm^2 ⓒ 40 cm^2 ⓓ 18 cm^2

3 The median of the triangle divides its surface into two triangles .....

ⓐ congruent. ⓑ equal in area.

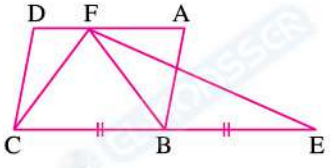
ⓒ equal in perimeter. ⓓ similar.

2 In the opposite figure : (2 marks)

ABCD is a parallelogram

, $E \in \overrightarrow{CB}$, where BC = BE

Prove that : The area of Δ EFC = The area of $\square$ ABCD



Test 2

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 The ratio between the area of the triangle and the area of the parallelogram whose base is common and are included between two parallel straight lines = ...

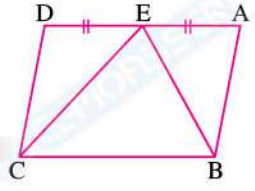
ⓐ 1 : 2 ⓑ 1 : 3 ⓒ 2 : 1 ⓓ 2 : 3

2 ABC is a triangle , $\overline{AD}$ is a median , then the area of Δ ABC = ...

ⓐ the area of Δ ABD ⓑ the area of Δ ACD

ⓒ 2 the area of Δ ABD ⓓ 3 the area of Δ ACD

3 **In the opposite figure :**



The area of the parallelogram ABCD = 24 cm^2

, then the area of Δ ABE = ... cm^2

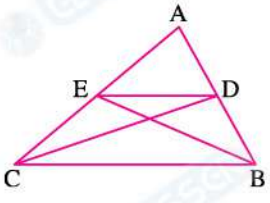
ⓐ 24 ⓑ 12

ⓒ 8 ⓓ 6

2 In the opposite figure : (2 marks)

If area of Δ ADC = area of Δ AEB

Prove that : $\overline{DE}$ // $\overline{BC}$



Test 3

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 ABCD is a parallelogram with area 100 cm^2 and $E \in \overline{AD}$, then the area of Δ EBC = ...

(a) 50 (b) 60 (c) 100 (d) 200

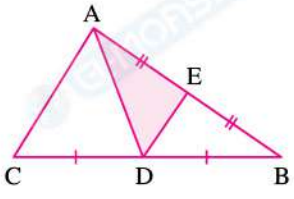
2 If ABCD is a parallelogram in which , AB = 5 cm. , BC = 10 cm. and its smaller height is 4 cm. , then its greater height equals .....

(a) 2 cm. (b) 4 cm.

(c) 8 cm. (d) 10 cm.

3 **In the opposite figure :**

If the area of Δ ABC = 24 cm^2 , then the area of Δ ADE = ...



(a) 6 cm^2 (b) 12 cm^2

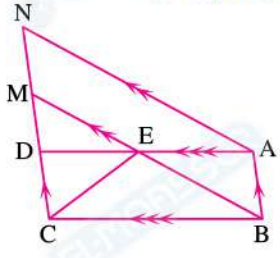
(c) 24 cm^2 (d) 48 cm^2

2 In the opposite figure : (2 marks)

ABCD and ABMN are two parallelograms.

Prove that :

The area of Δ EBC = $\frac{1}{2}$ the area of $\square$ ABMN



Test 4

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 The triangle whose base length 7 cm. and its area is 28 $cm.^2$, then the corresponding height equals .....

(a) 2 (b) 4 (c) 6 (d) 8

2 If the area of ▱ ABCD = 48 cm^2 , then the area of Δ ABC = ...

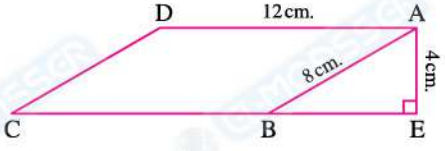
(a) 96 (b) 48

(c) 24 (d) 12

3 **In the opposite figure :**

ABCD is a parallelogram

, then area of ▱ ABCD = ...



(a) 32 (b) 16

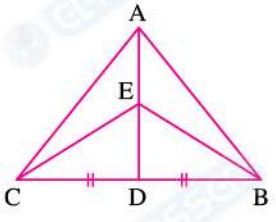
(c) 48 (d) 24

2 In the opposite figure : (2 marks)

D is midpoint of $\overline{BC}$, $E \in \overline{AD}$

Prove that :

The area of Δ ABE = the area of Δ ACE



Test 5

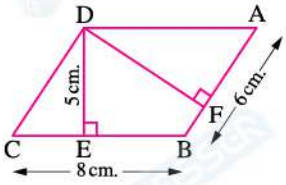
Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 In the opposite figure :

ABCD is a parallelogram

, then DF = ...



(a) 40 cm. (b) $6\frac{2}{3}$ cm.

(c) 6 cm. (d) 30 cm.

2 The area of a right-angled triangle in which the lengths of the sides of the right angle are 8 cm. and 13 cm. equals .....

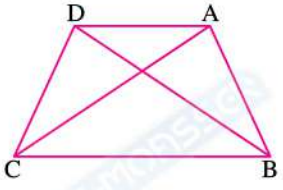
(a) 104 cm^2 (b) 52 cm^2

(c) 26 cm^2 (d) 202 cm^2

3 In the opposite figure :

If the area of Δ ABC = The area of Δ DBC

, then .....



(a) $\overline{AB}$ // $\overline{CD}$ (b) AB = CD

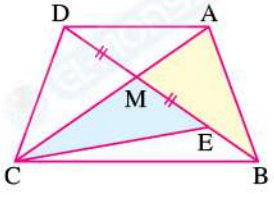
(c) $\overline{AD}$ // $\overline{BC}$ (d) AD = BC

2 In the opposite figure : (2 marks)

ME = MD

The area of Δ AMB = the area of Δ CME

Prove that : $\overline{AD}$ // $\overline{BC}$



Answers of Test 1

1 1 (c) 2 (a) 3 (b)

2 **(a)** $2x(x^2 - 4) = 2x(x - 2)(x + 2)$

(b) $(x + 2)(x^2 - 2x + 4)$

Answers of Test 2

1 1 (b) 2 (b) 3 (c)

2 **(a)** $(2x - 1)(x - 2)$

(b) $(2x - 5y)(2x + 5y)$

Answers of Test 3

1 1 (c) 2 (b) 3 (c)

2 **(a)** $(87 + 13)^2 = 100^2 = 10000$

(b) $(78 - 77)(78 + 77) = 1 \times 155 = 155$

Answers of Test 4

1 1 (d) 2 (a) 3 (d)

2 $\because 2x^2 + 19x + 35 = (2x + 5)(x + 7)$

$\therefore$ The two dimensions are $(2x + 5)$ cm. $(x + 7)$ cm.

when $x = 3$, then the two dimensions are 11 cm. and 10 cm.

, the perimeter = $2(11 + 10) = 42$ cm.

Answers of Test 5

1 1 (d) 2 (a) 3 (b)

2 **(a)** $3(x^2 - 5x + 4) = 3(x - 4)(x - 1)$

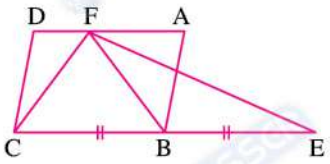
(b) $\frac{1}{2}(x^3 - 8) = \frac{1}{2}(x - 2)(x^2 + 2x + 4)$

Answers of Test 1

1 1 (b) 2 (c) 3 (b)

2 ∵ Δ BFC , ▱ ABCD have the common base $\overline{BC}$

, ∵ F ∈ $\overline{AD}$



∴ The area of Δ BFC = $\frac{1}{2}$ the area of ▱ ABCD(1)

∵ $\overline{FB}$ is a median in Δ FEC

∴ The area of Δ BFC = $\frac{1}{2}$ the area of Δ FEC (2)

From (1) and (2) :

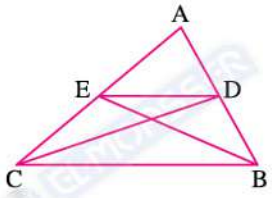
∴ The area of Δ FEC = The area of ▱ ABCD (Q.E.D.)

Answers of Test 2

1 1 (a) 2 (c) 3 (d)

2 ∵ The area of Δ ABE = the area of Δ ACD

and subtracting the area of Δ ADE from both sides.



∴ the area of Δ DEB = the area of Δ DEC

but they have the common base $\overline{DE}$ and on one side of it.

∴ $\overline{DE}$ // $\overline{BC}$ (Q.E.D.)

Answers of Test 3

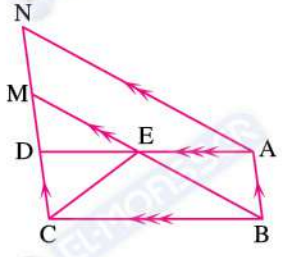
1 1 (a) 2 (c) 3 (a)

2 ∵ Δ EBC has the common base $\overline{BC}$ with the ▱ ABCD , E ∈ $\overline{AD}$

∴ The area of Δ EBC = $\frac{1}{2}$ the area of ▱ ABCD

, ∵ ▱ ABCD , ▱ ABMN have the common base $\overline{AB}$

and $\overleftrightarrow{AB}$ // $\overleftrightarrow{CN}$



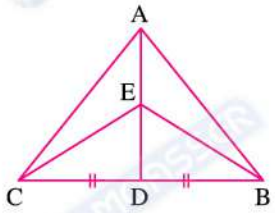
∴ The area of ▱ ABCD = the area of ▱ ABMN

∴ The area of Δ EBC = $\frac{1}{2}$ the area of ▱ ABMN (Q. E. D.)

Answers of Test 4

1 1 (d) 2 (c) 3 (c)

2 In Δ ABC :



∵ $\overline{AD}$ is a median

∴ area of Δ ABD = area of Δ ACD (1)

, in Δ BEC

∵ $\overline{ED}$ is a median

∴ Area of Δ EBD = area of Δ ECD (2)

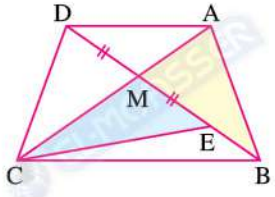
by subtracting (2) from (1)

∴ area of Δ ABE = area of Δ ACE (Q.E.D.)

Answers of Test 5

1 1 (b) 2 (b) 3 (c)

2 ∵ $\overline{MC}$ is a median in Δ DEC



∴ The area of Δ CME = the area of Δ CMD

, ∵ the area of Δ CME = the area of Δ AMB

∴ The area of Δ AMB = the area of Δ CMD

Adding the area of Δ AMD to both sides.

∴ The area of Δ ABD = the area of Δ ACD and they have the common base $\overline{AD}$ and on one side of it.

∴ $\overline{AD}$ // $\overline{BC}$ (Q.E.D.)

10 Marks

Model (1)

1 Complete: (3)

a If $(x + y) = 6, (x - y) = 4$, then $x^2 - y^2 =$ .....

b If (x + 2) is one of the factors of the expression $(x^2 + 7x + 10)$, then the other factor is .....

c If the expression $x^2 + 3x + a$ can be factorized and a ∈ N, then a = ...

2 Choose the correct answer: (3)

a If the expression $x^2 + b + 45 = (x + 5)(x + 9)$, then b = ...

$(2x , 7x , 14x , 49x)$

b $(\sqrt{5} + 2)(\sqrt{5} - 2)$ = ...

$(\sqrt{5} , 4 , 1 , -1)$

c One of the factors of the expression $x^2 + x - 6$ is .....

$((x - 3) , (x + 3) , (x + 2) , (x - 6))$

3 Answer the following: (4)

a If $(x + 5) = 4$ and $(x^3 + 125) = 32$.

Find the value of $x^2 - 5x + 25$

Solution:

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.....

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b **Factorize the following Perfectly:** $16x^4 - 72x^2y^2 + 81y^4$

Solution:

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NLAWMA Gem

10 Marks

Model (2)

1 Complete: 3

a $x^3 - 27 = (x - 3)$ .....

b The expression whose factorization is (a – 2b)(3a +b) is .....

c The expression $x^2 + kx + 25$ is a perfect square, then k = ...

2 Choose the correct answer: 3

a If $x - y = 5, x^2 + xy + y^2 = 7$, then $x^3 - y^3$ = ... (2 , 7 , 12 , 35)

b The expression $x^2 + x - m$ can be factorized if m = ... (1 , 3 , 4 , 6)

c If (m – 5n) is a factor of the expression $2m^2 - 7mn - 15n^2$, then the other factor is

..... ((2m + 3) , (m + 3n) , (2m + 3n) , (2m + n))

3 Answer the following: 4

a If the expression $x^2 + ax - 6$ can be factorized. **Find** the possible values of a.

Solution:

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b **Factorize:** $2x^4 + 32x^2y^2 + 128y^4$

Solution:

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ALAWA Gem

10 Marks

Model (3)

1 Complete: (3)

a The expression which can be factorized to $(2x - 3)(x + 1)$ is .....

b If $(x - 7)$ is one of the factors for the expression $x^2 - 10x + 21$, then the other factor is .....

c $\frac{1}{8}x^3 + 1 = \frac{1}{8}(x + 2)$ .....

2 Choose the correct answer: (3)

a The number which can be added to the expression $x^2 - 8x + 5$ to be factorized is ..... (1 , 2 , 4 , 5)

b If $x^2 + kx - 6 = (x + 3)(x - 2)$, then k = ... (–1 , 1 , 2 , 3)

c If $a^2 + b^2 = 15$, $2ab = 10$, then $a + b$ = ... (5 , –5 , ±5 , 25)

3 Answer the following: (4)

a **Use the factorization to find the value of:**

$(7.3)^2 + 2 \times 7.3 \times 2.7 + (2.7)^2$

Solution:

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.....

b **Find the value of the expression:** $x^2 - 5x + 6$, if $(x - 2) = 5$, and $(x - 3)^2 = 9$

Solution:

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NAJWA Gem

10 Marks

Model (4)

1 Complete: 3

a If $x^2 - K = (x - 3)(x + 3)$, then K = ...

b The expression $(8x^3 + 27y^3) = (2x + ...)(..... - 6xy + ...)$

c If $x + y = 7$, and $x - y = 5$, then $x^2 - y^2 =$ .....

2 Choose the correct answer: 3

a If the expression $x^2 + ax + 9$ is a perfect square, then a = ...

(± 3 , 3 , ±6 , 6)

b If the expression $x^2 + 2x - m$ can be factorized, then m = ...

(1 , 3 , 4 , 6)

c If $x^2 - y^2 = 45$, $x + y = 5$, then $x - y$ = ... (5 , 9 , 105 , 21)

3 Answer the following: 4

a **Factorize:**

$(x + 5)^3 + (x - 5)^3$

Solution:

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b **Factorize perfectly:**

$\frac{1}{4} m^2 - 2m + 4$

Solution:

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10 Marks

Model (5)

1 Complete: (3)

a Complete the missing term if the expression $z^4 + \ldots\ldots + 49L^2$ is a perfect square.

b If $5a^2 - 5b^2 = 100$, $a - b = 4$, then $a + b = \ldots\ldots$

c $x^3 - \ldots\ldots = (x - 2)(\ldots\ldots + \ldots\ldots + \ldots\ldots)$

2 Choose the correct answer: (3)

a If $x^2 - 2xy + y^2 = 25$, $x^2 + xy + y^2 = 7$, then $x^3 - y^3 = \ldots\ldots$

(±35 , 12 , ±52 , 7)

b The term which must be added to the expression $x^4 + 4x^2 + 16$ to be factorized is ..... (x^2 , $2x^2$, $4x^2$, $4x^3$)

c If $(3x + 2)$ is a factor of the expression $6x^2 + 13x + 6$, then the other factor is ..... ($(x + 3)$, $(2x + 1)$, $(2x + 3)$, $(x + 2)$)

3 Answer the following: (4)

a **Find the value of the following using the factorization:**

$(8.55)^2 - (1.45)^2$

Solution:

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b **Factorize:**

$(m - 2n)^3 + 8n^3$

Solution:

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ALAWWA Gem

10 Marks

Model (1)

1 Complete:

3

a In a parallelogram, the length of two consecutive sides are 8 cm, 12 cm, if the longest height is 6 cm, then the smallest height = ...

b The two triangles drawn between two parallel lines and one of their bases lies on one of these lines are ..... .

c A parallelogram, its area equals 72 cm^2, and the length of one of its bases is 12 cm, then the length of the corresponding height = ...

2 Choose the correct answer:

3

a The right-angled triangle whose side lengths are 3 cm, 4 cm, 5 cm, its area = ... cm^2. (10 , 12 , 6 , 15)

b The ratio between the area of a parallelogram and the area of triangle which have a common base and lie between two parallel lines is ..... (1 : 2 , 2 : 1 , 1 : 3 , 2 : 3)

c The length of the base of a parallelogram is 7 cm and the length of its corresponding height is 4 cm, then its area = ... cm^2. (56 , 14 , 28 , 8)

3 Answer the following:

4

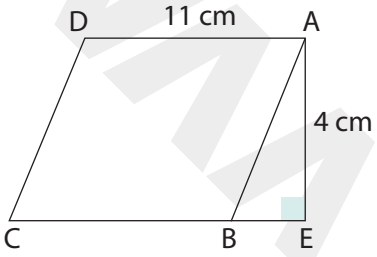
a **In the opposite figure:**

ABCD is a parallelogram in which

AD = 11cm, E $\in \overrightarrow{CB}$, $\overrightarrow{AE} \perp \overrightarrow{CB}$

AE = 4 cm.

Find the area of the parallelogram ABCD.



Solution:

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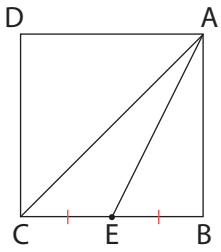
.....

b **In the opposite figure:**

ABCD is a square, E is the midpoint of BC

If the perimeter of the square = 36 cm.

Find by prove the area of Δ ABE.



Solution:

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ALAWWA Gem

10 Marks

Model (2)

1 Complete:

3

a The perimeter of a square is 20 cm, then its area = ...

b The area of the triangle in which the length of base is 6 cm, and the corresponding height equals 4 cm equals ..... .

c The parallelogram and the rectangle that have a common base and lie between two parallel lines ..... .

2 Choose the correct answer:

3

a If the area of a parallelogram is 24 cm^2, and the length of its base equals 8 cm, then the corresponding height of this base = ... cm. (8 , 6 , 4 , 3)

b A rectangle, its area is 50 cm^2, its length is 10 cm, then its width = ...

(5 , 10 , 6 , 4)

c The two triangles which are drawn on the same base and on the same side of this base, their vertices which lie on a line parallel to this base are ..... .

(perpendicular to , equal in area , parallel , intersecting)

3 Answer the following:

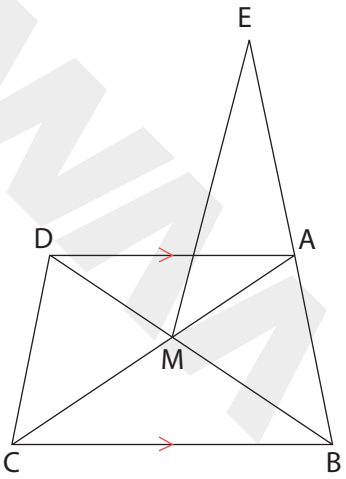
4

a **In the opposite figure:**

The area of Δ EAM = the area of Δ MBC,

$\overline{AD}$ // $\overline{BC}$.

Prove that: area of Δ EMB = area of Δ DBC



Solution:

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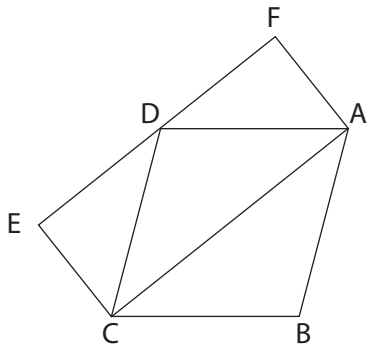
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b **In the opposite figure:**

ABCD and ACEF are two parallelograms,

$D \in \overline{EF}$.



Prove that:

Area of ▱ ABCD = area of ▱ ACEF

Solution:

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ALAWWA Gem

10 Marks

Model (3)

1 Complete: (3)

a ABCD is a parallelogram, if m(∠ A) = 80°, then m(∠ B) = ...

b Any triangle has at least ..... acute angles.

c The two triangles drawn on a common base and their vertices are located on straight line parallel to this base are ..... .

2 Choose the correct answer: (3)

a ABCD is a parallelogram whose area is 100 cm^2, E ∈ $\overline{AD}$, then the area of Δ BEC = ... cm^2 (100 , 50, 10 , 25)

b XYZL is a parallelogram in which XY = 6 cm, YZ = 5 cm and the length of the smallest height equals 4 cm, then its area = ... cm^2 (30 , 24 , 20 , 15)

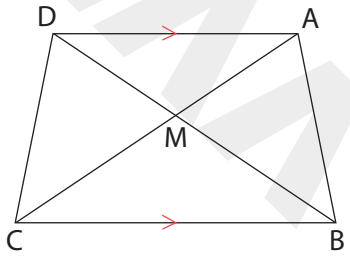
c The ratio between the area of the parallelogram and the area of the triangle which have the same base and lie between two parallel lines is ..... .

(1 : 2 , 1 : 3 , 2 : 1 , 2 : 3)

3 Answer the following: (4)

a **In the opposite figure:**

$\overline{AD}$ // $\overline{BC}$, $\overline{AC}$ ∩ $\overline{DB}$ = { M }



Prove that:

The area of Δ AMB = The area of Δ DMC

Solution:

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NAWA Gem

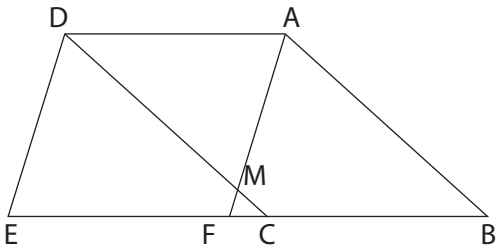
b **In the opposite figure:**

ABCD, AFED are two,

parallelograms C, F $\in \overline{BE}$

Prove that:

Area of figure ABCM = area of figure DEFM



Solution:

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ALAWWA Gem

10 Marks

Model (4)

1 Complete:

3

a The surfaces of two parallelograms that have the same base and lie between two parallel lines where one of them carries this base are ..... .

b The area of the triangle equals ..... the area of the parallelogram if they have ..... and lie between two ..... lines where one of them carries this base.

c The area of the parallelogram = ... × .....

2 Choose the correct answer:

3

a If the area of a parallelogram is 150 cm^2 and its height is 15 cm, then the length of the corresponding base = ... cm (15 , 20 , 10 , 25)

b The two triangles which are equal in area, drawn on one base and on the same side of it their vertices lie on a line ..... this base.

(perpendicular to , parallel to , equal in area , intersecting)

c The area of a rectangle ..... the area of a parallelogram if they have a common base and lie between two parallel lines where one of them carries this base.

(greater than , equals , half , less than)

3 Answer the following:

4

a In a parallelogram, the length of two adjacent sides are 8 cm, 10 cm and the length of the longest height is 6 cm.

Find the area of the parallelogram and the length of the smallest height.

Solution:

.....

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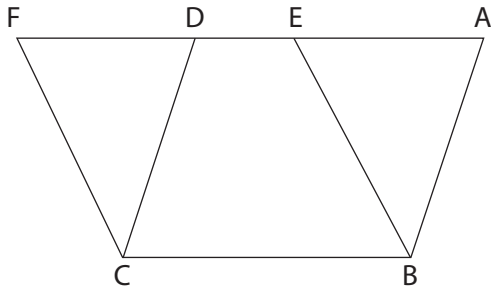
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KLAWN Gem

b **In the opposite figure:**

ABCD, EBCF are two parallelograms, where each of E and $F \in \overrightarrow{AD}$



Prove that:

Area of Δ ABE = area of Δ DCF

Solution:

.....

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ALAWWA Gem

10 Marks

Model (5)

1 Complete:

3

a A parallelogram, the length of two adjacent sides in it are 8 cm and 10 cm, if the length of the longest height is 16 cm , then the area of it = ...

b If the area of a triangle is 48 cm^2, the length of its base is 12 cm , then the corresponding height = ... cm

c The area of a parallelogram ..... the area of triangle with a common base and lie between two parallel lines.

2 Choose the correct answer:

3

a A triangle with area 24 cm^2, the length of its height is 4 cm , then the length of the corresponding base = ... cm (6 , 12 , 8 , 9)

b If the area of a parallelogram is 70 cm^2, and the length of one of its sides is 14 cm, then the length of the corresponding height = ... cm . (7 , 5 , 8 , 6)

c The two triangles of equal areas with a common base and on the same side of it, their vertices lie on a line ..... to this base .

(bisects , intersects , parallel , perpendicular)

3 Answer the following:

4

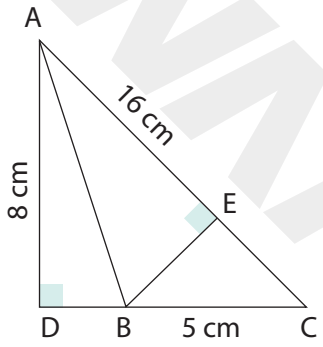
a **In the opposite figure:**

$\overline{AD} \perp \overrightarrow{CB}$, $\overline{BE} \perp \overline{AC}$, AC = 16 cm

BC = 5 cm, AD = 8 cm.

Find: 1) The area of ABC

2) The length of BE.



Solution:

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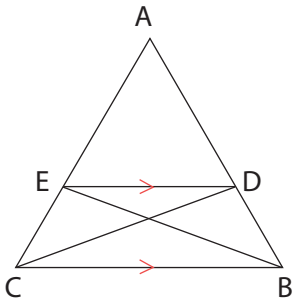
.....

b **In the opposite figure:**

ABC is a triangle, $\overline{BC}$ // $\overline{DE}$

Prove that:

Area of Δ ABE = area of Δ ACD



Solution:

.....

.....

.....

.....

ALAWWA Gem

10 Marks

Model (1)

1 Complete: (3)

a If $(x + y) = 6, (x - y) = 4$, then $x^2 - y^2 = 24$

b If (x + 2) is one of the factors of the expression $(x^2 + 7x + 10)$, then the other factor is $(x + 5)$

c If the expression $x^2 + 3x + a$ can be factorized and a ∈ N, then a = 2

2 Choose the correct answer: (3)

a If the expression $x^2 + b + 45 = (x + 5)(x + 9)$, then b = ...

$(2x , 7x , 14x , 49x)$

b $(\sqrt{5} + 2)(\sqrt{5} - 2)$ = ...

$(\sqrt{5} , 4 , 1 , -1)$

c One of the factors of the expression $x^2 + x - 6$ is .....

$((x - 3) , (x + 3) , (x + 2) , (x - 6))$

3 Answer the following: (4)

a If $(x + 5) = 4$ and $(x^3 + 125) = 32$.

Find the value of $x^2 - 5x + 25$

Solution:

$\because x^3 + 125 = (x + 5)(x^2 - 5x + 25)$

$\therefore 32 = 4 \times (x^2 - 5x + 25)$

Then $(x^2 - 5x + 25) = 32 \div 4 = 8$

b **Factorize the following Perfectly:** $16x^4 - 72x^2y^2 + 81y^4$

Solution:

$16x^4 - 72x^2y^2 + 81y^4 = (4x^2 - 9y^2)^2 (4x^2 - 9y^2)^2$

$= (4x^2 - 9y^2)^2$

ALAWWA Gem

10 Marks

Model (2)

1 Complete: (3)

a $x^3 - 27 = (x - 3)(x^2 + 3x + 9)$

b The expression whose factorization is (a – 2b)(3a +b) is $3a^2 - 5ab - 2b^2$

c The expression $x^2 + kx + 25$ is a perfect square, then k = ± 10

2 Choose the correct answer: (3)

a If $x - y = 5, x^2 + xy + y^2 = 7$, then $x^3 - y^3$ = ... (2 , 7 , 12 , **35**)

b The expression $x^2 + x - m$ can be factorized if m = ... (1 , 3 , 4 , **6**)

c If (m – 5n) is a factor of the expression $2m^2 - 7mn - 15n^2$, then the other factor is ..... ((2m + 3) , (m + 3n) , **(2m + 3n)** , (2m + n))

3 Answer the following: (4)

a If the expression $x^2 + ax - 6$ can be factorized. **Find** the possible values of a.

Solution:

$x^2 + ax - 6$ can be factorized to $(x - 6)(x + 1)$

Or to $(x + 6)(x - 1)$ which means a = –5 or 5

other possible value a = –1 or +1

b **Factorize:** $2x^4 + 32x^2y^2 + 128y^4$

Solution:

$2x^4 + 32x^2y^2 + 128y^4$

$= 2(x^4 + 16x^2y^2 + 64y^4)$

$= 2(x^2 + 8y^2)^2$

ALNAWAH Gem

10 Marks

Model (3)

1 Complete: (3)

a The expression which can be factorized to $(2x - 3)(x + 1)$ is $(2x^2 - x - 3)$

b If $(x - 7)$ is one of the factors for the expression $x^2 - 10x + 21$, then the other factor is $(x - 3)$.

c $\frac{1}{8}x^3 + 1 = \frac{1}{8}(x + 2)(x^2 - 2x + 4)$

2 Choose the correct answer: (3)

a The number which can be added to the expression $x^2 - 8x + 5$ to be factorized is ..... (1 , **2** , 4 , 5)

b If $x^2 + kx - 6 = (x + 3)(x - 2)$, then k = ... (–1 , **1** , 2 , 3)

c If $a^2 + b^2 = 15$, $2ab = 10$, then $a + b$ = ... (5 , –5 , **±5** , 25)

3 Answer the following: (4)

a **Use the factorization to find the value of:**

$(7.3)^2 + 2 \times 7.3 \times 2.7 + (2.7)^2$

Solution:

$(7.3)^2 + 2 \times 7.3 \times 2.7 + (2.7)^2$

$= (7.3 + 2.7)^2 = (10)^2 = 100$

b **Find the value of the expression:** $x^2 - 5x + 6$,

if $(x - 2) = 5$, and $(x - 3)^2 = 9$

Solution:

$\because x^2 - 5x + 6 = (x - 2)(x - 3)$

And $(x - 3)^2 = 9$

So $(x - 3) = \pm 3$

Then $(x - 2)(x - 3) = 5 \times 3 = 15$

Or $(x - 2)(x - 3) = 5 \times -3 = -15$

NAJWA Gem

10 Marks

Model (4)

1 Complete: (3)

a If $x^2 - K = (x - 3)(x + 3)$, then K = 9

b The expression $(8x^3 + 27y^3) = (2x + 3y)(4x^2 - 6xy + 9y^2)$

c If $x + y = 7$, and $x - y = 5$, then $x^2 - y^2 = 35$

2 Choose the correct answer: (3)

a If the expression $x^2 + ax + 9$ is a perfect square, then a = ...

(± 3 , 3 , ±6 , 6)

b If the expression $x^2 + 2x - m$ can be factorized, then m = ...

(1 , 3 , 4 , 6)

c If $x^2 - y^2 = 45$, $x + y = 5$, then $x - y$ = ... (5 , 9 , 105 , 21)

3 Answer the following: (4)

a **Factorize:**

$(x + 5)^3 + (x - 5)^3$

Solution:

$[(x + 5) + (x - 5)][(x + 5)^2 - (x + 5)(x - 5) + (x - 5)^2]$

$= (2x)(x^2 + 10x + 25 - x^2 + 25 + x^2 - 10x + 25)$

$= 2x(x^2 + 75)$

b **Factorize perfectly:**

$\frac{1}{4} m^2 - 2m + 4$

Solution:

By taking a common factor $\frac{1}{4}$ from the expression.

Then $\frac{1}{4}(m^2 - 8m + 16)$

$= \frac{1}{4}(m - 4)^2$

Gem

Model (5)

10 Marks

1 Complete: (3)

a Complete the missing term if the expression $z^4 + 14z^2 L + 49 L^2$ is a perfect square.

b If $5a^2 - 5b^2 = 100$, $a - b = 4$, then $a + b =$ **5**

c $x^3 - 8 = (x - 2)$ ($x^2 + 2x + 4$)

2 Choose the correct answer: (3)

a If $x^2 - 2xy + y^2 = 25$, $x^2 + xy + y^2 = 7$, then $x^3 - y^3 =$ .....

(±35 , 12 , ±52 , 7)

b The term which must be added to the expression $x^4 + 4x^2 + 16$ to be factorized is .....

(x^2 , $2x^2$, $4x^2$, $4x^3$)

c If $(3x + 2)$ is a factor of the expression $6x^2 + 13x + 6$, then the other factor is .....

($(x + 3)$, $(2x + 1)$, $(2x + 3)$, $(x + 2)$)

3 Answer the following: (4)

a **Find the value of the following using the factorization:**

$(8.55)^2 - (1.45)^2$

Solution:

$\because (8.55)^2 - (1.45)^2 = (8.55 - 1.45)(8.55 + 1.45)$

$\therefore (8.55)^2 - (1.45)^2 = 7.1 \times 10 = 71$

b **Factorize:**

$(m - 2n)^3 + 8n^3$

Solution:

$(m - 2n)^3 + 8n^3$

$= [(m - 2n) + 2n][(m - 2n)^2 - 2n(m - 2n) + 4n^2]$

$= m(m^2 - 4mn + 4n^2 - 2mn + 4n^2 + 4n^2)$

$= m(m^2 - 6mn + 12n^2)$

10 Marks

Model (1)

1 Complete:

3

a In a parallelogram, the length of two consecutive sides are 8 cm, 12 cm, if the longest height is 6 cm, then the smallest height = **4 cm**.

b The two triangles drawn between two parallel lines and one of their bases lies on one of these lines are **equal in area**.

c A parallelogram, its area equals 72 cm^2, and the length of one of its bases is 12 cm, then the length of the corresponding height = **6 cm**.

2 Choose the correct answer:

3

a The right-angled triangle whose side lengths are 3 cm, 4 cm, 5 cm, its area = ... cm^2. (10 , 12 , **6** , 15)

b The ratio between the area of a parallelogram and the area of triangle which have a common base and lie between two parallel lines is ..... (1 : 2 , **2 : 1** , 1 : 3 , 2 : 3)

c The length of the base of a parallelogram is 7 cm and the length of its corresponding height is 4 cm, then its area = ... cm^2. (56 , 14 , **28** , 8)

3 Answer the following:

4

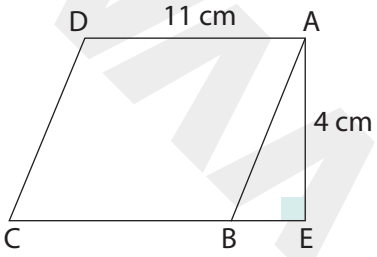
a **In the opposite figure:**

ABCD is a parallelogram in which

AD = 11cm, E $\in \overrightarrow{CB}$, $\overrightarrow{AE} \perp \overrightarrow{CB}$

AE = 4 cm.

Find the area of the parallelogram ABCD.



Solution:

$\because \overrightarrow{AE} \perp \overrightarrow{CB}$

$\therefore \overline{AE}$ is the height of the parallelogram ABCD.

and $\because$ AD = CB $\therefore$ CB = 11 cm

$\because$ The area of the parallelogram = base × height

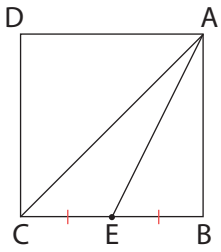
$\therefore$ The area of the parallelogram ABCD = 11 × 4 = 44 cm^2

b **In the opposite figure:**

ABCD is a square, E is the midpoint of BC

If the perimeter of the square = 36 cm.

Find by prove the area of Δ ABE.



Solution:

∵ The perimeter of the square = 36 cm

∴ The length of its side = 36 ÷ 4 = 9 cm

Then the length of BE = 4.5 cm

∴ The area of Δ ABE = $\frac{1}{2} \times 4.5 \times 9 = 20.25$ cm^2

NLAWWA Gem

10 Marks

Model (2)

1 Complete:

3

a The perimeter of a square is 20 cm, then its area = 25 cm^2

b The area of the triangle in which the length of base is 6 cm, and the corresponding height equals 4 cm equals 12 cm^2.

c The parallelogram and the rectangle that have a common base and lie between two parallel lines are equal in area.

2 Choose the correct answer:

3

a If the area of a parallelogram is 24 cm^2, and the length of its base equals 8 cm, then the corresponding height of this base = ... cm. (8 , 6 , 4 , **3**)

b A rectangle, its area is 50 cm^2, its length is 10 cm, then its width = ...

(**5** , 10 , 6 , 4)

c The two triangles which are drawn on the same base and on the same side of this base, their vertices which lie on a line parallel to this base are ..... .

(perpendicular to , **equal in area** , parallel , intersecting)

3 Answer the following:

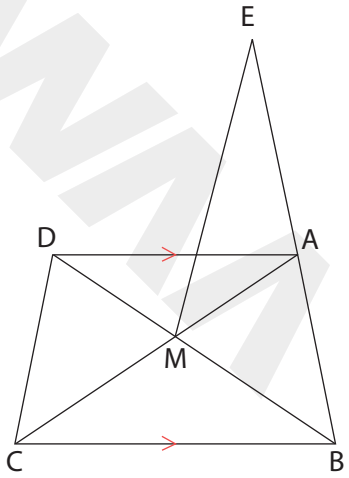
4

a **In the opposite figure:**

The area of Δ EAM = the area of Δ MBC,

$\overline{AD}$ // $\overline{BC}$.

Prove that: area of Δ EMB = area of Δ DBC



Solution:

∵ $\overline{AD}$ // $\overline{BC}$

∴ Area Δ of DCB = area Δ of ABC ⟶ (1)

∵ Area of Δ ABC = area of Δ ABM + area of Δ MBC ⟶ (2)

Area of Δ EAM = area Δ of MBC ⟶ (3)

From (1) , (2) , (3)

∴ Area of Δ EMB = area of Δ ABC = area of Δ DBC #

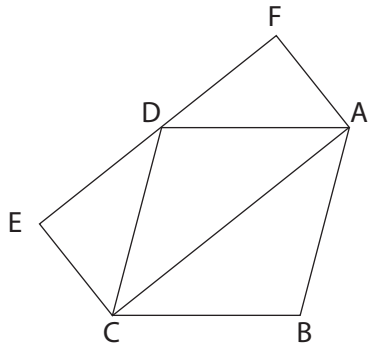
b **In the opposite figure:**

ABCD and ACEF are two parallelograms,

$D \in \overline{EF}$.

Prove that:

Area of $\square$ ABCD = area of $\square$ ACEF



Solution:

$\because$ ABCD is a parallelogram, and $\overline{AC}$ is a diagonal

$\therefore$ Area of Δ DAC = $\frac{1}{2}$ the area of $\square$ ABCD ⟶ (1)

And $\because$ ACEF is a parallelogram , $E \in \overline{EF}$

$\therefore$ Area of Δ DAC = $\frac{1}{2}$ the area of $\square$ ACEF ⟶ (2)

From (1) and (2) we deduce that:

The area of $\square$ ABCD = area of $\square$ ACEF

ALAWWA Gem

10 Marks

Model (3)

1 Complete: (3)

a ABCD is a parallelogram, if m(∠ A) = 80°, then m(∠ B) = **100°**

b Any triangle has at least **two** acute angles.

c The two triangles drawn on a common base and their vertices are located on straight line parallel to this base are **equal in area**.

2 Choose the correct answer: (3)

a ABCD is a parallelogram whose area is 100 cm^2, E ∈ $\overline{AD}$, then the area of Δ BEC = ... cm^2 (100 , **50**, 10 , 25)

b XYZL is a parallelogram in which XY = 6 cm, YZ = 5 cm and the length of the smallest height equals 4 cm, then its area = ... cm^2 (30 , **24** , 20 , 15)

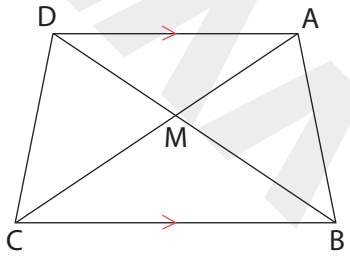
c The ratio between the area of the parallelogram and the area of the triangle which have the same base and lie between two parallel lines is ..... .

(1 : 2 , 1 : 3 , **2 : 1** , 2 : 3)

3 Answer the following: (4)

a **In the opposite figure:**

$\overline{AD}$ // $\overline{BC}$, $\overline{AC}$ ∩ $\overline{DB}$ = { M }



Prove that:

The area of Δ AMB = The area of Δ DMC

Solution:

∵ $\overline{AD}$ // $\overline{BC}$

∴ Area of Δ ABC = area of Δ DCB

By subtracting area of Δ MBC from the two sides

∴ Area of Δ AMB= area of Δ DMC

NAJWA Gem

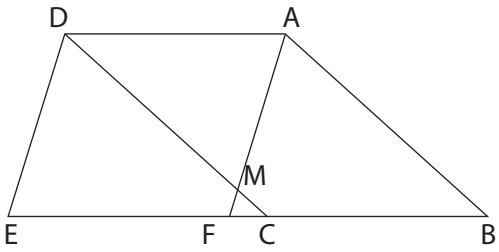
b **In the opposite figure:**

ABCD, AFED are two,

parallelograms C, F $\in \overline{BE}$

Prove that:

Area of figure ABCM = area of figure DEFM



Solution:

$\because$ ▱ ABCD and ▱ AFED have the same base $\overline{AD}$ and lie between two parallel lines.

$\therefore$ Area ▱ ABCD = area of ▱ AFED

By subtracting area of Δ AMD from the two sides.

$\therefore$ Area of the figure ABCM = area of figure DEFM.

ALAWWA Gem

10 Marks

Model (4)

1 Complete:

3

a The surfaces of two parallelograms that have the same base and lie between two parallel lines where one of them carries this base are **equal in area**.

b The area of the triangle equals $\frac{1}{2}$ the area of the parallelogram if they have **a common base** and lie between two **parallel** lines where one of them carries this base.

c The area of the parallelogram = **base** × **its height**.

2 Choose the correct answer:

3

a If the area of a parallelogram is 150 cm^2 and its height is 15 cm, then the length of the corresponding base = ... cm (15 , 20 , **10** , 25)

b The two triangles which are equal in area, drawn on one base and on the same side of it their vertices lie on a line ..... this base.

(perpendicular to , **parallel to** , equal in area , intersecting)

c The area of a rectangle ..... the area of a parallelogram if they have a common base and lie between two parallel lines where one of them carries this base.

(greater than , **equals** , half , less than)

3 Answer the following:

4

a In a parallelogram, the length of two adjacent sides are 8 cm, 10 cm and the length of the longest height is 6 cm.

Find the area of the parallelogram and the length of the smallest height.

Solution:

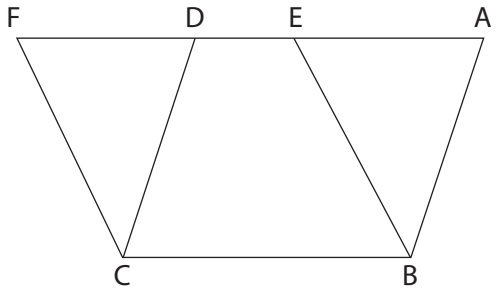
∵ The area of the parallelogram = base x its height

Then the area of the parallelogram = $6 \times 8 = 48$ cm^2

The length of the smallest height = $48 \div 10 = 4.8$ cm.

b **In the opposite figure:**

ABCD, EBCF are two parallelograms, where each of E and $F \in \overrightarrow{AD}$



Prove that:

Area of Δ ABE = area of Δ DCF

Solution:

$\because$ ▱ ABCD and ▱ EBCF have a common base $\overline{BC}$ and lie between two parallel lines $\overleftrightarrow{AF}$, $\overleftrightarrow{BC}$

$\therefore$ Area of ▱ ABCD = area of ▱ EBCF

By subtracting area of the figure EBCD from the two sides.

$\therefore$ Area of Δ ABE = area of Δ DCF.

ALAWWA Gem

10 Marks

Model (5)

1 Complete:

3

a A parallelogram, the length of two adjacent sides in it are 8 cm and 10 cm, if the length of the longest height is 16 cm , then the area of it = 128 cm^2

b If the area of a triangle is 48 cm^2, the length of its base is 12 cm , then the corresponding height = 8 cm

c The area of a parallelogram = 2 the area of triangle with a common base and lie between two parallel lines.

2 Choose the correct answer:

3

a A triangle with area 24 cm^2, the length of its height is 4 cm , then the length of the corresponding base = ... cm (6 , 12 , 8 , 9)

b If the area of a parallelogram is 70 cm^2, and the length of one of its sides is 14 cm, then the length of the corresponding height = ... cm . (7 , 5 , 8 , 6)

c The two triangles of equal areas with a common base and on the same side of it, their vertices lie on a line ..... to this base .

(bisects , intersects , parallel , perpendicular)

3 Answer the following:

4

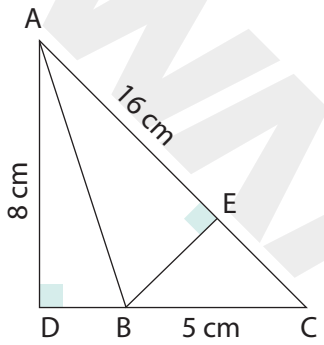
a **In the opposite figure:**

$\overline{AD} \perp \overrightarrow{CB}$, $\overline{BE} \perp \overline{AC}$, AC = 16 cm

BC = 5 cm, AD = 8 cm.

Find: 1) The area of ABC

2) The length of BE.



Solution:

$\because$ The area of $\Delta ABC = \frac{1}{2} \times$ base $\times$ height

$= \frac{1}{2} \times 5 \times 8 = 20\ cm^2$

And the area of $\Delta ABC = \frac{1}{2} \times 16 \times BE$

$\therefore 20 = 8 \times BE$

$\therefore BE = \frac{20}{8} = 4.5$ cm.

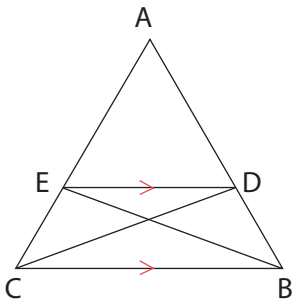
NAJWA Gem

b **In the opposite figure:**

ABC is a triangle, $\overline{BC}$ // $\overline{DE}$

Prove that:

Area of Δ ABE = area of Δ ACD



Solution:

∵ $\overline{BC}$ // $\overline{DE}$

∴ Area of Δ DBE = area of Δ ECD

By adding area of Δ ADE for the two sides

∴ Area of Δ ABE = area of Δ ACD

ALAWA Gem

Date: …..... /……... /…....

Unit 1: Factroization
Lesson 1: Factroizing the quadratic Trinonial

$$ax^2 + bx^2 + c$$

Board Summary

The H.C.F of 3 and 6 is 3
The H.C.F of x , x^2 and is x

Example: <u>Factorize completely:</u>

1- $x^2 - 5x + 6 =$

2- $x^2 + 4x - 12$

3- $x^3 - 6x^2 + 8x^2$

4- $2x^2 - 3xy - 5y^2$

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Date: ……. /……. /…….

Evaluation

1- Complete:

(1) $x^2 - 8x + 15 = (\quad)(\quad)$
(2) $x^2 - 7x + 12 = (\quad)(\quad)$
(3) $x^3 - 5x^2 - 14x = (\quad)(\quad)$
(4) $x^2 + \ldots\ldots + 35 = (x + \ldots\ldots)(\ldots\ldots + 5)$
(5) $x^2 - 11x + 18 = (\quad)(\quad)$

2- Factorize completely:

(1) $a^2 - 3ab + 2b^2$ =

(2) $x^2y - 4xy - 12y$ =

(3) $2x^2 - 14x + 24$ =

3- If $x^2 + kx + 5$ can be factorized then find the possible values of k

4- If $x + y = 5$ and $x + 2y = 8$ then

Find the value of $x^2 + 3xy + 2y^2$.

Geel 2000 language school

Date: ……. /……. /…….

Homework

1- Complete:

(a) $x^2 - 3x - 10 =$ ( )( )

(b) $x^2 + 7x + 10 =$ ( ) ( )

(c) $x^2y - xy - 12y =$ ( )( )

2- Factorize completely:

(1) $x^2 + 7x - 18 =$

(2) $x^3 - 5x^2 + 6x =$

(3) $x^3 - 2x^2 - 15x =$

3- Complete:

(1) If $x - 2$ is a factor of the expression $x^2 - 7x + 10$ then the other factor is…

(2) If the algebraic expression $x^2 + kx + 2$ can be factorized then k=…….

Remembe



***Factorizing an algebraic expression means to write it as a product of two factors or more.**
*** When we factorize a quadratic trinomial we simplify the expression and order it descendingly according to the power of x Then we factorize the expression which inside the brackets.**

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Date: ……. /……. /…….

Unit 1: Factroization
Lesson2: Factroizing the quadratic Trinonial

$a\,x^2 + b\,x^2 + c$ $\quad a \neq \pm 1$

Board Summary

Factorize:

$5\,x^2 - 2\,x - 7 = (5\,x - \cdots \ldots \ldots)(x + \cdots \ldots \ldots \ldots \ldots)$

$3\,x^2 + 7\,x - 6 = (3\,x - \cdots \ldots \ldots)(\ldots \ldots \ldots + \cdots \ldots \ldots \ldots \ldots)$

$10\,a^2 + 11ab - 18\,b^2$

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Evaluation

1- Complete:

(1) $2x^2 - 10x + 15 =$ ( ) ( )

(2) $3x^2 + 10x + 8 =$ ( ) ( )

(3) $6x^2 - 11x - 10 =$ ( ) ( )

2- Factorize completely:

(1) $2x^2 - 14x + 24$

(2) $2x^2 - 3x - 2$

(3) $3x^2 + 5x + 2$

3- If($2x - 7$) is one of the factors of the expression ($6x^2 - 19x - 7$) Find the other factor.

4- If $x + y = 5$ and $x + 2y = 8$ then

Find the value of $x^2 + 3xy + 2y^2$.

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Homework

1- Complete:

(a) $3x^2 - 20x - 7y^2 = (\quad)(\quad)$

(b) $5x^2 - 7x - 6 = (\quad)(\quad)$

(c) $5x^2 - 11x - 12 = (\quad)(\quad)$

(d) $3x^2 + 7x + 2 = (\quad)(\quad)$

2- Factorize completely:

(1) $3x^2 - 5x + 2 =$ ……

(2) $6x^2 + x - 15 =$ ……..

(3) If $x + y = 3$ and $2x - y = 9$

, then the value of $2x^2 + xy - y^2 =$ …….

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Remember



***Factorizing an algebraic expression means to write it as a product of two factors or more.**
*** When we factorize a quadratic trinomial we simplify the expression and order it disceningly according to the power of x Then we factorize the expression which inside the brackets.**

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Date: …..... /……... /…....

Unit 1: Factroization

Lesson3: Factroizing the perfect square trinonial

Board Summary

1- Which of the following is a perfect square:

(1) $9x^2 + 30xy + 25y^2$
(2) $4x^2 + 9xy + 9y^2$
(3) $x^2 + 4xy - 4y^2$
(4) $x^2 + y^2$

2- Choose the correct answer:

(1)If $x^2 + kx + 16$ is a perfect square then k = ……. (4 , ± 4 , 8 , ± 8)
(2)If $x^2 + 14x + c$ is a perfect square then c = ……... (2 , 7 , 14 , 49).
(3)If $a^2 + 2ab + b^2 = 25$ then a + b = …….. (5 , -5 , ± 5 , 50).

3- Factorize completely:

1) $4x^2 + 12x + 9$
2) $x^2 - 10xy + 25y^2$

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Evaluation

1- Complete

(1) $x^2 - 8x + 16 = (\quad)^2$

(2) $x^2 + 18x + 81 = (\quad)^2$

(3) $4x^2 + 20x + 25 = (\quad)^2$

2- Factorize completely:

(1) $y^2 - 22y + 121$

(2) $4a^2 - 36ab + 81b^2$

(3) $9x^2 - 24x + 16$

(4) $x^2 - 4xy + 4y^2$

3- Find the value of k to get a perfect square:

(1) $x^2 + kx + 1$
(2) $kx^2 - 8x + 16$
(3) $25x^2 - 60x + k$
(4) $25a^2 + 2a + k$

4- Using factorization find the value of:

(1) $(3.7)^2 - 2 \times 3.7 \times 2.7 + (2.7)^2$

(2) If $x + \frac{1}{x} = 5$ find the value of $x^2 + \frac{1}{x^2}$

6- Choose:

(1) If $x^2 + kx + 25$ is a perfect square then k = (5 , ±5 , 10 , ±10)

(2) If $9x^2 + 24x + c$ is a perfect square then c = (4 , 8 , 64 , 16)

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Date: ……. /……. /…….

Homework

1- Complete

(a) $x^2 - 4x + 4 = (\quad)^2$

(b) If $x^2 + kx + 49$ is a perfect square then k = ……

(c) A square its side length $= (x^2 + 10x + 25)\ cm^2$

then its side length =… … … cm

(d) If $L + M = 12$ then $l^2 + 2lM + M^2$= ……

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Unit 1: Factroization

Lesson4: Factroizing the difference of two squares

Board Summary

Example: Choose the correct answer:

(1) If $a - b = 2$, $a + b = 8$ then $a^2 - b^2 = \cdots$ (16 , 6 , 4 , 10)

(2) $If\ a^2 - b^2 = 18$, $a - b = 2\ then\ \sqrt{a+b} = \cdots$ (9 , 3 , ± 3 , -3)

Critical thinking:

If $a > b$, $a^2 - 2ab + b^2 = 25$, $a + b = 7$ Find the value of $a^2 - b^2$

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Evaluation

1- Complete

(1) $x^2 - 100$ =( )( )

(2) $4x^2 - 81$ =( )( )

(3) $4x^2 - 25$ =( )( )

(4) If $x^2 - y^2 = 15$, $x + y = 5$ then $x - y =$ … … ….

(5) If $x^2 + k + 17 = (x - 5)(x + 5)$ then $k =$ … … ….

2- Factorize completely:

(1) $4x^2 - 49$

(2) $9a^2 - 64b^2$

(3) $2x^2 - 18$

(4) $\frac{1}{3}x^2 - 3$

(5) $x^3 - 25x$

3-Choose the correct answer:

(1) If $x^2 - k = (x - 4)(x + 4)$ then $k =$ ---------- (4 , −4 , 16 , −16)

(2) If $a^2 - b^2 = 16$, $(a - b) = 2$ then $(a + b) =$ …. (32 , 14 , 18 , 8)

(3) If $(77)^2 - (23)^2 =$ ---------- (405 , 4500 , 54 , 54000)

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Homework

1- Complete:

(a) $x^2 - 36 = (\quad)(\quad)$

(b) $l^2 - \frac{1}{4} = (\quad)(\quad)$

(c) $If\ (x-3)\ (x+3) = 7\ then\ \ x =$ … … ….

(d) $If\ (x^2 - k) = (x-6)\ (x+6)\ then\ \ k =$ … … ….

2- Factorize completely:

(1) $x^2 - 36$

(2) $(x+2)^2 - 9$

(3) $3x^2 - 75$

3- Factorize completely:

(a) $(85)^2 - (15)^2$

(b) $(6.4)^2 - (3.6)^2$

4- Factorize completely:

$$x^2(a-b) - y^2(a-b)$$

Remember



Factorizing the difference of two squares.

$$(\sqrt{1st} + \sqrt{2nd})\ (\sqrt{1st} - \sqrt{2nd})$$

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Date: ……. /……. /…….

Unit 1: Factroization

Lesson 5: Factroizing the sum and difference of two cubes

Board Summary

$(1) x^3 - 1 \quad (2) x^3 + 125$

$(3)\ If\ a^3 - 27 = \ldots\ldots, (a - k)(a^2 + 3a + 9)\ then\ k = \ldots\ldots (3, -3, 9, -9)$

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Evaluation

1- Complete

(1) $x^3 - 1$ =( )( )

(2) $x^3 + 27$ =( )( )

(3) $x^3 + 64$ =( ) ( )

(4) $x^3 - 125$ =( ) ( )

(5) $27\,x^3 + 8$ =( ) ( )

(6) $If\ (x + y) = 3\ ,(x^2 - xy + y^2) = 7\ then\ x^3 + y^3 =$ ----------

(7) $x^3 - a$ =$(x - 2)(x^2 + 2x + 4)\ then\ a =$ ----------

2- Factorize completely:

(1) $y^3 - 27$

(2) $8x^3 - 125$

(3) $7a^3 - 56b^3$

(4) $16x^3y - 54y$

(5) $a^6 - 64b^3$

(6) $x^6 - 1$

(7) $\frac{1}{2}x^3 - 4$

(8) $x^6 + 1$

Date: ……. /……. /…….

Homework

(1)Complete

(1)$x^3 - 216$ =( )( )

(2) $8b^3 + 27$ =( )( )

(3) $If\ \ x^3 + y^3 = 28\ \ ,x^2 - xy + y^2 = 7\ then\ x + y =$ … …

(2)Factorize completely:

(1)$x^3 + 1000$

(2)$3x^3 - 81$

(3)$x^6 - y^6$

(4)$(x + 2)^3 + 8$

(5)$8x^3 + \frac{1}{8}$

*Critical thinking:

$If\ \ a^2 + b^2 = 13\ \ ,\ a + b = 5\ find\ the\ value\ of\ \ a^3 + b^3$

Remember



* $x^3 + y^3 = (x + y)\ (x^2 - xy + y^2)$
* $x^3 - y^3 = (x - y)\ (x^2 + xy + y^2)$

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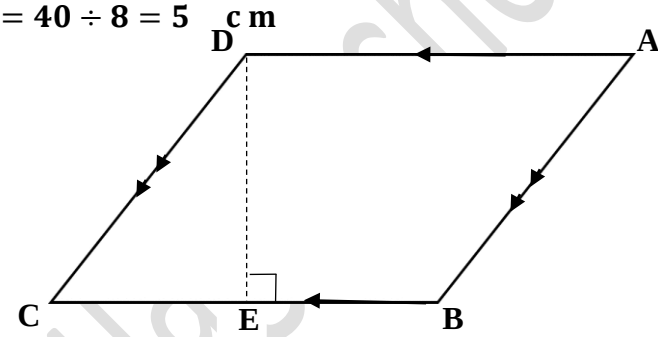
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Unit 4: Areas

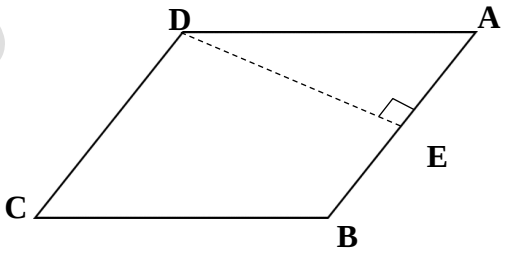
Lesson 1: Equality of areas of two parallelograms

Board Summary

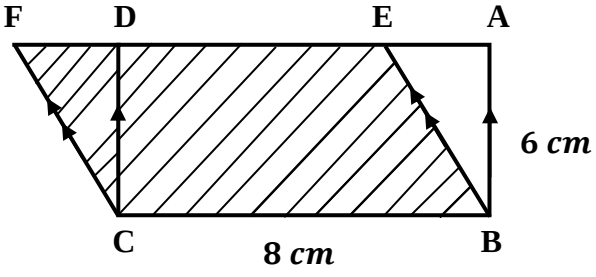
1) In the opposite figure: area of the parallelogram ABCD = 40cm^2 , BC = 8 cm ,
$\overline{DE} \perp \overline{BC}$ then DE = 40 ÷ 8 = 5 c m



2) In the opposite figure area of the parallelogram ABCD = 24cm^2 , BC = 6 cm
$\overline{DE} \perp \overline{AB}$ then AB = ----------cm



3) In the opposite figure: ABCD, is a rectangle , EBCF is a parallelogram, F ∈ $\overrightarrow{AD}$If , AB = 6 cm , BC = 8 cm then area of parallelogram EBCF = ... cm^2



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Evaluation

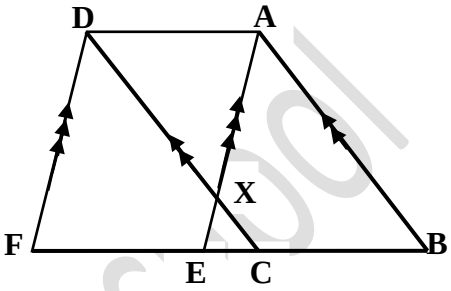
(1) $If\ ABCD\ and\ AEFD\ are\ two\ parellograms\ , \overline{AE} \cap \overline{CD} = \{X\}\ \ Prove\ that$:
$area\ of\ figure\ ABCX = area\ of\ figure\ DFEX$

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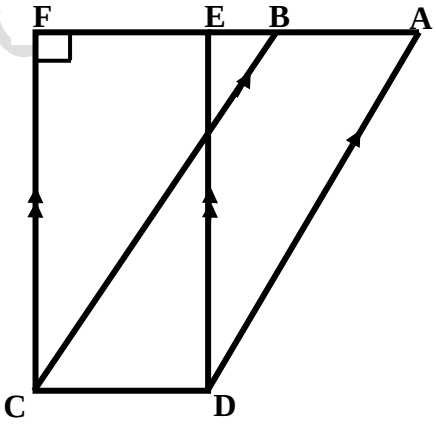
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(2) $In\ the\ opposite\ figure$: , $\overline{AB} \parallel \overline{DE}$, $F \in \overrightarrow{AB}$, $the\ figure\ CDEF\ is\ a\ rectangle$,
$\overline{AD} \parallel \overline{BC}$, $Find$ **1)** $The\ area\ of\ figure\ ABCD$
2) $If\ AD$
$= 18\ cm$. $Find\ the\ length\ of\ the\ peripendicular\ line\ segment\ drawn\ from\ B\ to\ \overline{AD}$



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Homework

1- Complete:

(1) *Two paralleograms having a common base and lying between two parallel straight lines are* ----------

(2) *If the area of paralleogram is* $40\ cm^2$ *and its height is* $5\ cm$ *then the length of its corresponding base* = ---------- *cm*

(3) *The area of a paralleogram* = ----------× *its corresponding height*

(4) *If the area of a paralleogram is* $36\ cm^2$ *and the lengths of its bases are* $6\ cm, 4\ cm$ *then the length of its smaller height* = ---------- *cm*

2- Choose the correct answer:

(1) *A paralleogram its two adjacent sides of lengths* $9\ cm$ *and its shorter height is* $4\ cm$ *. then its longer height* = --------~~cm~~ ($6, 12, 24, 36$)

(2) *A paralleogram its base length* = $7\ cm$ *and its area* = $35\ cm^2$ *then its corresponding height* = ----------*cm* ($42, 28, 245, 5$)

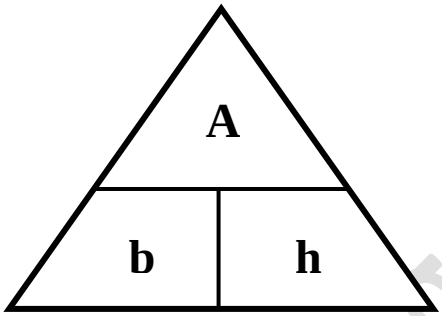
(3) *A paralleogram its area is* $24\ cm^2$ *and its length of its two bases are* $4\ cm, 6\ cm$. *then its smaller height* = ---------- *cm* ($2, 3, 4, 6$)

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Remember



Area of parallelogram = base length × its corresponding height



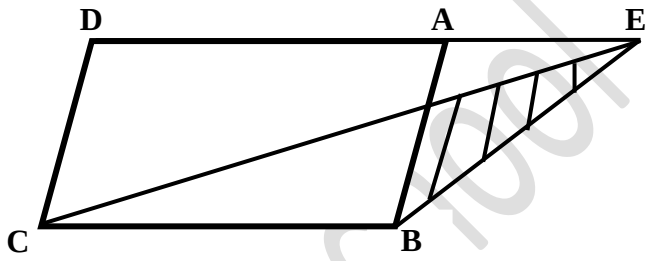
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Unit 4: Areas

Lesson 2: Follow equality of areas of two parallelograms

Board Summary



(1)If the area of a parallelogram ABCD is 60 cm^2 , E $\in$ $\overrightarrow{DA}$ *then the area of* $\Delta EBC =$ cm^2

***Solution*: *area of*Δ $EBC = \frac{1}{2}$ *area of* $ABCD = 30\ cm^2$**

(2) *Find the area of triangle of base lenght* 10 *cm and its corresponding heigth is* 8 *cm*

(3)A triangle its surface area $= 60\ cm^2$ and its heigth $= 10$ cm . Find the length of its coressponding base.

(4) *A triangle its area is* 60 cm^2 *and its base length is* 10 *cm Find the corresponding height*

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Evaluation

(1) $ABCD$ *and* $AEFD$ *are two parallelograms*, $\overrightarrow{AD} \cap \overrightarrow{DC} = \{X\}$
prove that area of $\Delta ABX =$ *area of* ΔDFX

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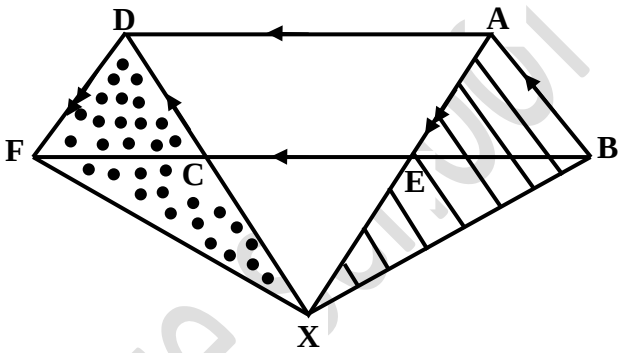
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(2) *In the opposite figure*: $ABCD$ *and* $AFXE$ *are two parallelograms*
prove that they are equal in area and if the area of $\Delta ADC = 20\ cm^2$
Find the area of parallelogram $AFXE$

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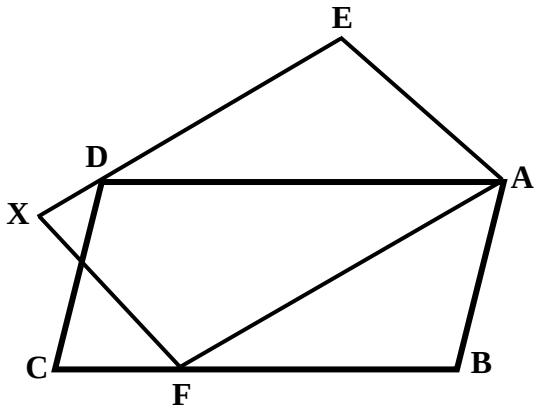
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Homework

1- Complete:

(1) *The ratio between the area of a paralleogram and the area of a triangle which have a common base and lying between two parallel straight lines is* ---------- : ----------

(2) *The area of a right angled triangle whose two sides of the right angle are of lengtht* 6 *cm and* 8 *cm is* ---------- cm^2

(3) *A triangle of area* 32 cm^2 *and its height* = 8 *cm then corresponding base its length* = ---------- *cm*

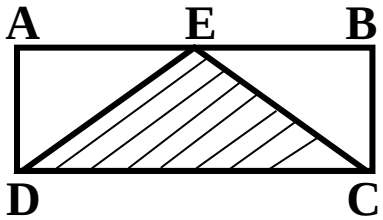
2- Choose the correct answer:

(1) *A triangle of area* 120 cm^2 *and the length of its base is* 15 *cm then its corresponding height.* = ---------- *cm* (8 , 16 , 12 , 24)

(2) *The ratio between the area of a paralleogram and the area of a triangle which having a common base and a commom height* = -----: -----
(2: 1 , 1: 2 , 3: 1 , 1: 3)

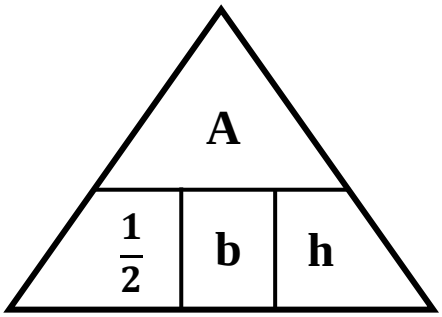
(3) *The area of triangle* = ---------- *the area of the paralleogram with a common base and lying between two paraleel straight lines.*
(*twice* , *third* , *quarter* , *half*)

(4) *In the opposite figure the area of* $\Delta EDC = 7cm^2$
then the area of the rectangle $ABCD$ = ---------- cm^2
(7 , 14 , 3.5 , 49)



Remember

Area of $\Delta = \frac{1}{2} \times b \times h$



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Unit 4: Areas

Lesson 3 : Equality of areas of two triangles

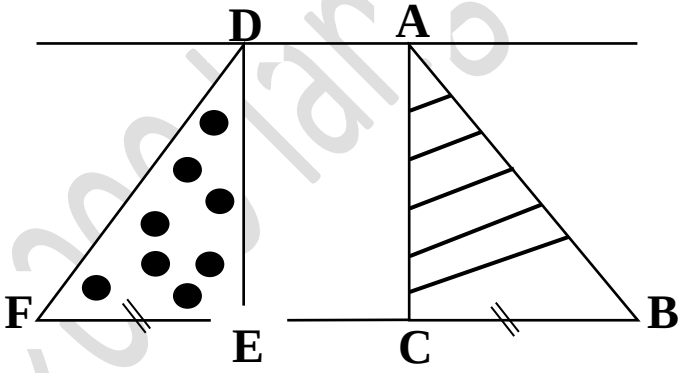
Board Summary

(1) Complete:

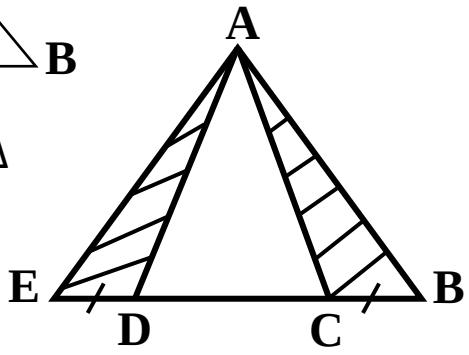
1)***Triangle with equal bases and lying between two parallel straight lines are***

2)***The median of a triangle divides its surface into two triangles equal in area***

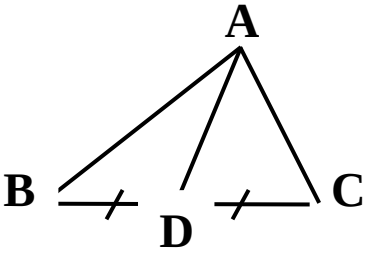
3)***If*** $\overleftrightarrow{AD} \parallel \overleftrightarrow{BF}$ ***,*** $BC = EF$ ***then area of*** ΔABC ***= area of*** Δ



4)***If*** $BC = DE$ ***then area of*** ΔABC ***= area of*** Δ



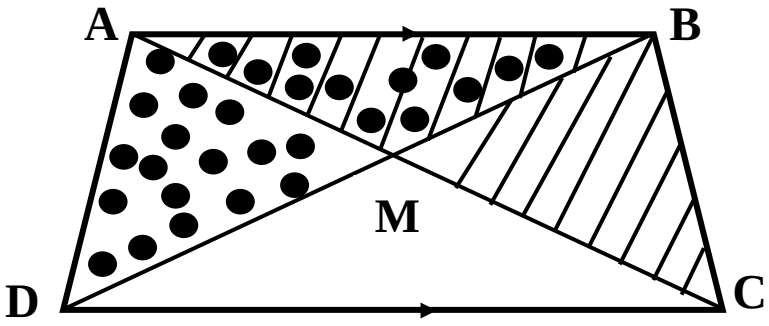
5) ***In*** ΔABC ***if*** $\overline{AD}$ ***is a median then area of*** ΔADC ***= area of*** Δ



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6) *If $\overline{AB} \parallel \overline{CD}$ then area of ΔACB = area of Δ* _____
***area of ΔCBD = area of Δ* _____**



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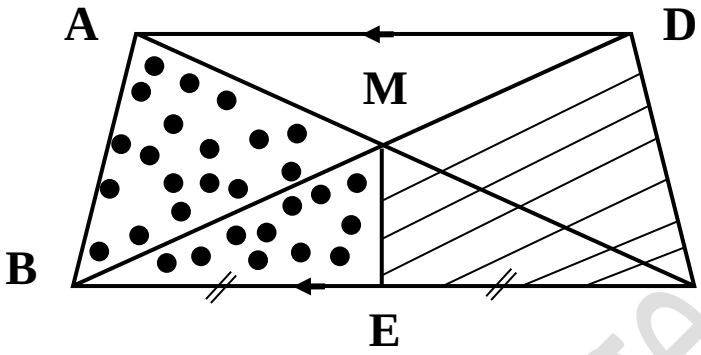
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Date: ……. /……. /…….

Evaluation

1) $If\ ABCD\ is\ equadrilateral, \overline{AD} \parallel \overline{BC}, E\ is\ a\ mid\ point\ of\ \overline{BC}, \overline{AC} \cap \overline{BD} = \{M\}$
$Prove\ that$:
$area\ of\ the\ figure\ ABEM = area\ of\ the\ figure\ DCEM$



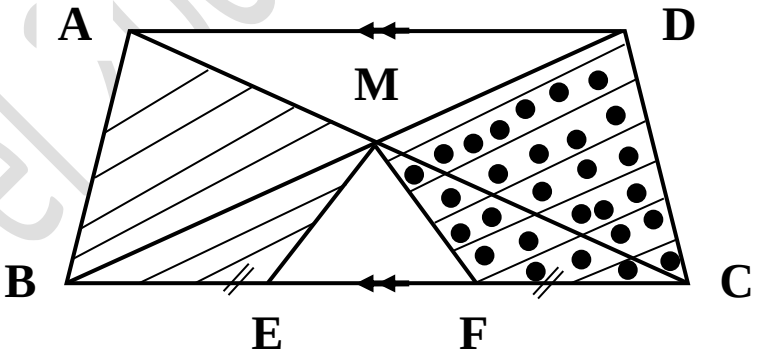
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2) $In\ the\ opposite\ figure$
$\overline{AD} \parallel \overline{BC}, \overline{BC}, \overline{AC} \cap \overline{BD} = \{M\}, E, F \in \overline{BC}\ where\ EB = FC$
$Prove\ that$:
$area\ of\ the\ figure\ ABEM = area\ of\ the\ figure\ DCFM$



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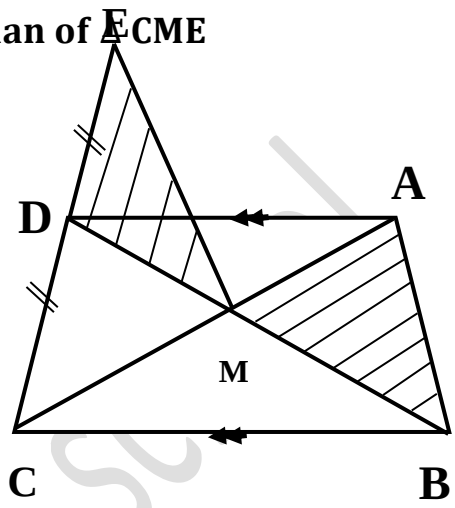
Homework

1) In the opposite figure

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$, $\overline{MD}$ **is a median of** ΔCME

Prove that:

area of ΔAMB = **area of** ΔCME



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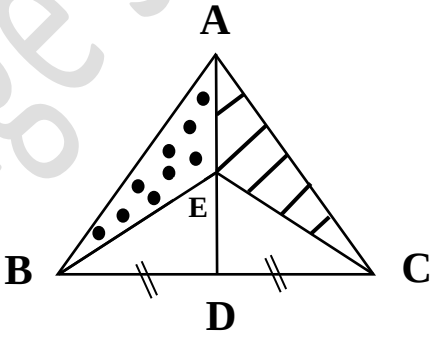
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2) ***In the opposite figure***

$\overline{AD}$ ***is a median of*** ΔABC , $E \in \overline{AD}$

Prove that:

area of (ΔABE) = ***area of*** $\Delta(ACE)$



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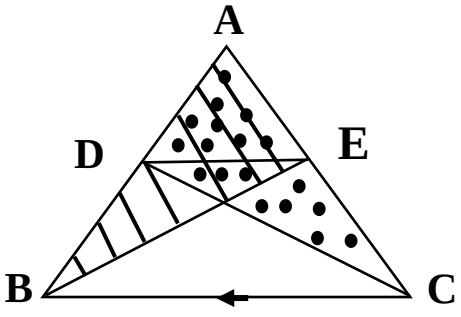
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3) ***In the opposite figure***

$\overline{DE} \parallel \overline{BC}$

Prove that:

area of (ΔABE) = ***area of*** $\Delta(ACD)$



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Date: …..... /..…... /…....

Remember



*** The median of triangle divides its surface into two triangles equal in area.**
*** Two triangles which have the same base and lying between two parallel straight lines are equal in area.**
*** Two triangles with a common vertex and equal bases lie on the same straight line are equal in area.**

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Unit 4: Areas

Lesson 4 : Follow equality of areas of two triangles (the convers of the therom)

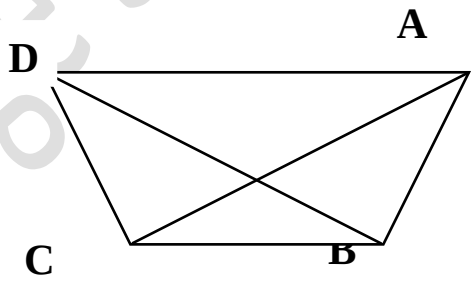
Board Summary

1)The two triangles which are equal in area and drawn on the same base *from one side of it then their vertices lie on a straight line parallel to this base*

2) ***In the opposite figure***

If area of $(\Delta\, ABD) =$ ***area of*** $\Delta(\, ACD\,)$ ***then***

… … ∥ … …

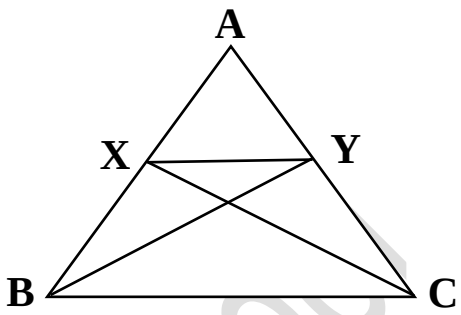


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Evaluation

1) $If\ area\ \Delta\ AXC = area\ AYB\ ,\ \ Prove\ that: \overline{XY} \parallel \overline{BC}$



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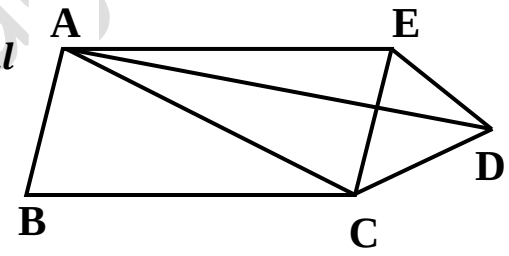
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2) $In\ the\ opposite\ figure\ ABCD\ is\ a\ quadrilatural$
$area\ (\Delta\ ABC) = area\ \Delta(\ ADC\ ),$
$ABCE\ is\ a\ parallelogram\ Prove\ that: \overline{ED} \parallel \overline{AC}$



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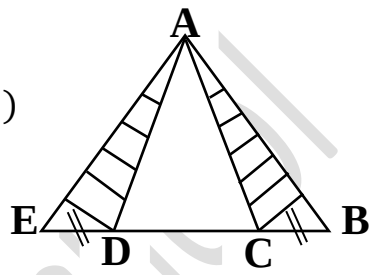
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Homework

(1) Complete:

(1) ---------- *of a triangle divides its surface into two triangles equal in area.* (*Altitude , Median , side, otherwise*)

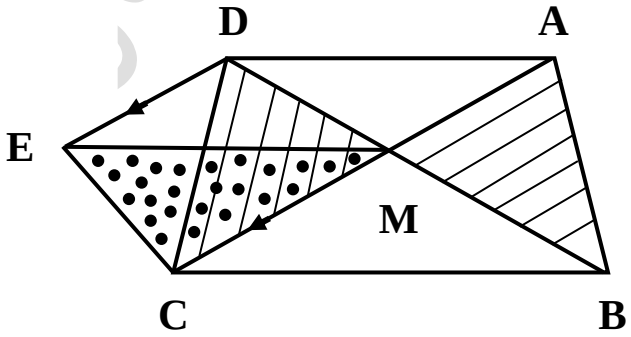
(2) *If* $BC = DE$ *then area* (ΔABC) ---------- *area* (ΔADE)
Where $D, C \in \overline{EB}$



(3) *The median of a triangle divides its surface into two triangles equal in* ----------
(*length – perimeter – area – volume*)

(4) *The two triangles which are equal in area and drawn on the same base from one side of it their vertices lie on a straight line* ---------- *this base*
(*parallel to – perpendicular to – equal to*)

(2) *If* $\overline{AC} \cap \overline{BD} = \{M\}$,
area ΔAMB = *area* ΔDMC
Prove that:
1) $\overline{AD} \parallel \overline{BC}$
2) *area* (ΔAMB) = *area* (ΔEMC)



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Algebra

1. Choose the correct answer:

1 If $(5x - 7)$ is a factor of the expression : $5x^2 - 2x - 7$, then the other factor is .....

(a) $x - 1$ (b) $x - 5$ (c) $x + 1$ (d) x

2 If the expression : $x^2 + ax - 5$ can be factorized , then a = ...

(a) 1 (b) 4 (c) 5 (d) 6

3 If the expression : $x^2 - cx + 12$ can be factorized , then c = ...

(a) – 1 (b) 4 (c) 7 (d) 1

4 Which of the following numbers can be added to the expression : $x^2 - 8x + 5$ to be factorized ?

(a) 1 (b) 2 (c) 4 (d) 5

5 The expression : $x^2 + 5x + m$ can be factorized , if m = ...

(a) 12 (b) 7 (c) – 14 (d) – 2

6 The expression : $x^2 + 5x + m$ can be factorized , if m = ...

(a) 5 (b) 1 (c) 6 (d) 7

7 The expression : $x^2 + 7x + b$ can be factorized , if b = ...

(a) 3 (b) 4 (c) 6 (d) 7

8 If $(x + 3)$ is one factor of the expression : $x^2 + x - 6$, then the other factor is .....

(a) $x - 2$ (b) $x - 3$ (c) $x + 2$ (d) $x + 6$

9 If the expression : $x^2 + ax - 12$ can be factorized , then a may be equal to .....

(a) 12 (b) – 8 (c) 8 (d) – 1

10 The number can be added to the expression : $2x^2 + 5x - 10$ to be factorized is .....

(a) – 1 (b) – 2 (c) – 3 (d) – 4

11 $5x^2 - 7x - 6 = (5x + 3)(x - .....)$

(a) 3 (b) 2 (c) – 3 (d) – 2

12 If $(2a - 5)(3a - 2) = 6a^2 + ka + 10$, then k = ...

(a) 15 (b) 19 (c) – 19 (d) 4

---

13 $2x^2 + 5x + 3 = (..... + 3)(x + 1)$

(a) x (b) $2x$ (c) $3x$ (d) $5x$

---

14 If $x^2 + kx + 25$ is a perfect square , then k = ...

(a) 5 (b) 10 (c) ± 10 (d) ± 5

---

15 If $x^2 - kx + 25$ is a perfect square , then k = ...

(a) 2 (b) 10 (c) 5 (d) 50

---

16 If $kx^2 + 12x + 9$ is a perfect square , then k = ...

(a) 3 (b) 4 (c) 9 (d) 16

---

17 $(x + 3y)^2 = x^2 + ... + 9y^2$

(a) $6xy$ (b) $9xy$ (c) $3xy$ (d) 6

---

18 If $y^2 + 12y + m$ is a perfect square , then m = ...

(a) 25 (b) 36 (c) – 36 (d) 100

---

19 If the expression : $x^2 - 6x - m$ is a perfect square , then m = ...

(a) – 9 (b) 1 (c) 2 (d) 9

---

20 The missing term in the expression : $9x^2 + ... + 16y^2$ to be a perfect square is .....

(a) $12xy$ (b) $24x$ (c) $24xy$ (d) $12x^2y^2$

---

21 If $x^2 - a = (x - 3)(x + 3)$, then a = ...

(a) 3 (b) – 3 (c) 9 (d) – 9

---

22 If $x - y = 3$, $x + y = 6$, then $x^2 - y^2$ = ...

(a) 12 (b) 9 (c) 3 (d) 18

---

23 If $x^2 - y^2 = 16$, $x - y = 2$, then $x + y$ = ...

(a) 4 (b) 8 (c) – 8 (d) 2

24 If $x + y = 3$, $x^2 - xy + y^2 = 5$, then $x^3 + y^3 =$ .....

(a) 15 (b) 25 (c) 8 (d) 7

---

25 If $a^3 - b^3 = 64$, $a^2 + ab + b^2 = 16$, then $a - b =$ .....

(a) 8 (b) -4 (c) 4 (d) 48

---

26 $(x + 1)(x^2 - x + 1) =$ .....

(a) $x^3 - 1$ (b) $x^3 + 1$ (c) $(x - 1)^3$ (d) $(x + 1)^3$

---

27 $(75)^2 - (25)^2 = 100 \times$ .....

(a) 75 (b) 50 (c) 100 (d) 25

---

28 If $x^3 + y^3 = 28$, $x + y = 2$, then $x^2 - xy + y^2 =$ .....

(a) 48 (b) 14 (c) 2 (d) 7

---

29 The expression : $x^4 + 4$ can be factorized as a perfect square by adding the term ..... and its additive inverse.

(a) $4x^2$ (b) $2x^2$ (c) $8x^2$ (d) $4x^4$

---

30 If $x^2 - 2xy + y^2 = 25$, then $x - y =$ .....

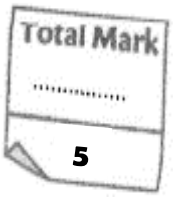
(a) 25 (b) -5 (c) 5 (d) ± 5

2. Answer the following:

1 Factorize each of the following completely :

1. $a x + b x + 5a + 5b$
2. $x^2 + 8x + 15$
3. $x^2 - 8x + 12$
4. $x^2 + 13x - 30$
5. $x^2 - 3x - 18$
6. $(c+d)^2 + 5(c+d) + 6$
7. $3x^2 + 7x + 2$
8. $2x^2 + x - 6$
9. $2x^2 - 3x + 1$
10. $2x^2 - 5x - 12$
11. $x^2 - 9$
12. $16x^2 - 9$
13. $8x^3 + 125$
14. $3x^3 - 81$
15. $a^3 + 0.008$
16. $b x + b y + c x + c y$
17. $x y + 3y + 5x + 15$
18. $a^2 + 2ab + b^2 - c^2$

Model 1



1 **Choose the correct answer from the given ones :** **(3 Marks)**

1 If $x - y = 5$, $x + y = 3$, then $x^2 - y^2 =$ .....

(a) 8 (b) 15 (c) 2 (d) $\frac{5}{3}$

2 $5x^2 - 7x - 6 = (5x + 3)(x -$ .....$)$

(a) 3 (b) 2 (c) -3 (d) -2

3 The expression : $x^2 - 5x + c$ is factorizable when c = ...

(a) 7 (b) 8 (c) -3 (d) 6

---

2 **Use the factorization to find :** $(98)^2 - 4$ **(2 Marks)**

Model 2

Total Mark 5

1 Choose the correct answer from the given ones : (3 Marks)

1 The expression : a $x^2 + 24x + 9$ is a perfect square , then a = ...

(a) 25 (b) 8 (c) 16 (d) 4

2 $2x^2 + 5x + 3 = (\ldots\ldots + 3)(x + 1)$

(a) x (b) $2x$ (c) $3x$ (d) $5x$

3 If $x^2 - a = (x - 3)(x + 3)$, then a = ...

(a) 3 (b) – 3 (c) 9 (d) – 9

---

2 Factorize : (2 Marks)

1 $3x^2 + 7x + 2$

2 $3x^3 + 81$

Model 3

Total Mark 5

1 Choose the correct answer from the given ones : (3 Marks)

1 $(x+3y)^2 = x^2 + \ldots\ldots\ldots\ldots + 9y^2$

(a) $6xy$ (b) $9xy$ (c) $3xy$ (d) 6

2 If $x+y=3$, $x^2-xy+y^2=5$, then $x^3+y^3 = \ldots\ldots\ldots\ldots$

(a) 15 (b) 25 (c) 8 (d) 7

3 If $2x^2+cx-3=(2x+3)(x-1)$, then $c = \ldots\ldots\ldots\ldots$

(a) 3 (b) 1 (c) -2 (d) 4

---

2 Factorize : (2 Marks)

1 x^3-8

2 $ax-5x+3a-15$

The Answers (1. Choose the correct answer)

1 (c)	2 (b)	3 (c)	4 (b)	5 (c)
6 (c)	7 (c)	8 (a)	9 (d)	10 (b)
11 (b)	12 (c)	13 (b)	14 (c)	15 (b)
16 (b)	17 (a)	18 (b)	19 (a)	20 (c)
21 (c)	22 (d)	23 (b)	24 (a)	25 (c)
26 (b)	27 (b)	28 (b)	29 (a)	30 (d)

The Answers (2. Answer the following)

1 $a(x+5)+b(x+5)=(x+5)(a+b)$

2 $(x+3)(x+5)$

3 $(x-2)(x-6)$

4 $(x-2)(x+15)$

5 $(x+3)(x-6)$

6 $((c+d)+2)((c+d)+3)$

7 $(3x+1)(x+2)$

8 $(2x-3)(x+2)$

9 $(2x-1)(x-1)$

10 $(2x+3)(x-4)$

11 $(x-3)(x+3)$

12 $(4x-3)(4x+3)$

13 $(2x+5)(4x^2-10x+25)$

14 $3(x-3)(x^2+3x+9)$

15 $(a+0.2)(a^2-0.2a+0.04)$

16 $x(b+c)+y(b+c)=(b+c)(x+y)$

17 $y(x+3)+5(x+3)=(x+3)(y+5)$

18 $(a+b)^2-c^2=(a+b+c)(a+b-c)$

Geometry

1. Choose the correct answer:

1 If the base length of a parallelogram is 7 cm. and the corresponding height is 4 cm. , then its area equals .....

(a) 11 cm^2 (b) 14 cm^2 (c) 22 cm^2 (d) 28 cm^2

---

2 If the area of a parallelogram is 35 cm^2 and the length of one of its sides is 7 cm. , then the corresponding height to this side is ..... cm.

(a) 10 (b) 5 (c) 7 (d) $\frac{5}{2}$

---

3 The area of the parallelogram in which the lengths of two adjacent sides are 5 cm. and 7 cm. and its smaller height is 4 cm. equals ..... cm^2

(a) 120 (b) 28 (c) 35 (d) 20

---

4 If the lengths of two adjacent sides of a parallelogram are 6 cm. and 7 cm. and its greater height is 5 cm. , then its area equals ..... cm^2

(a) 30 (b) 35 (c) 42 (d) 49

---

5 If the lengths of two adjacent sides of a parallelogram are 9 cm. and 6 cm. and its smaller height is 4 cm. , then its greater height is ..... cm.

(a) 36 (b) 24 (c) 12 (d) 6

---

6 The area of a triangle is ..... the area of a parallelogram if they have a common base lying on one of two parallel straight lines including them.

(a) equal to (b) half (c) twice (d) quarter

---

7 The ratio between the area of the parallelogram and the area of the triangle whose base is common and are included between two parallel straight lines equals .....

(a) 1 : 2 (b) 1 : 3 (c) 2 : 1 (d) 2 : 3

---

8 If ABCD is a parallelogram , $E \in \overline{AD}$, the area of Δ EBC = 35 cm^2 , then the area of $\square$ ABCD = ... cm^2

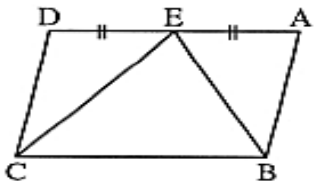
(a) 35 (b) 70 (c) 17 (d) 17.5

9 **In the opposite figure :**

If ABCD is a parallelogram ,

its area = 24 cm^2

, then the area of Δ ABE = ... cm^2



(a) 24 (b) 12 (c) 8 (d) 6

---

10 The triangle whose base length is 12 cm. and its area is 48 cm^2 , then the corresponding height is .....

(a) 3 cm. (b) 4 cm. (c) 6 cm. (d) 8 cm.

---

11 If the area of a triangle is 24 cm^2 and its height is 8 cm. , then the length of the corresponding base is ..... cm.

(a) 16 (b) 6 (c) 3 (d) 2

---

12 The area of the rectangle whose dimensions are 6 cm. and 4 cm. ..... the area of the triangle whose base length is 12 cm. and its corresponding height is 4 cm.

(a) < (b) > (c) = (d) ≠

---

13 The median of a triangle divides its surface into two triangular surfaces .....

(a) congruent. (b) equal in area. (c) similar. (d) coincide.

---

14 ABC is a triangle in which D is the midpoint of $\overline{BC}$, then Δ ABD , Δ ACD are .....

(a) similar. (b) equal in area.

(c) congruent. (d) all the previous.

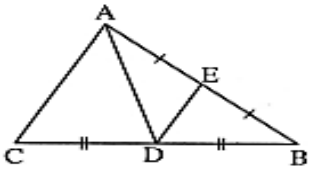
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15 **In the opposite figure :**

The area of Δ AED = ... the area of Δ ABC

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$

(c) $\frac{1}{4}$ (d) $\frac{1}{8}$



---

16 If ABCD is a parallelogram whose area is 100 cm^2 , E ∈ $\overline{AD}$, F is the midpoint of $\overline{BC}$, then the area of Δ EBF = ... cm^2

(a) 100 (b) 50 (c) 10 (d) 25

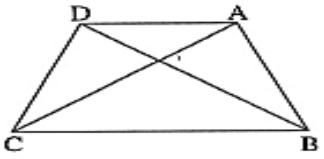
17 **In the opposite figure :**

If the area of Δ ABC = the area of Δ DBC

, then .....

(a) $\overline{AB}$ // $\overline{CD}$ (b) AB = CD

(c) $\overline{AD}$ // $\overline{BC}$ (d) AD = BC



2. Answer the following:

1 Find the area of the parallelogram in which the lengths of two adjacent sides are 6 cm. and 8 cm. and its greater height is 5 cm.

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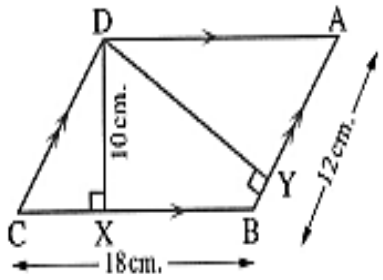
2 **In the opposite figure :**

ABCD is a parallelogram , AB = 12 cm.

, BC = 18 cm. , DX = 10 cm.

Find : [1] The area of ▱ ABCD

[2] The length of $\overline{DY}$



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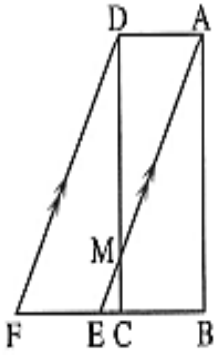
3 **In the opposite figure :**

ABCD is a rectangle , $\overline{AE} // \overline{DF}$

, $E \in \overrightarrow{BC}$, $F \in \overrightarrow{BC}$

Prove that :

The area of the figure ABCM = the area of the figure DMEF



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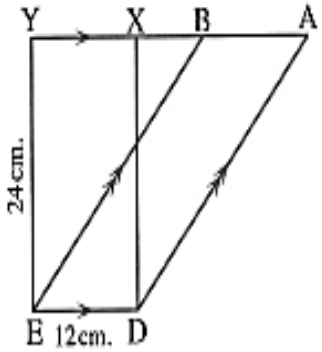
4 **In the opposite figure :**

$\overleftrightarrow{AB} // \overleftrightarrow{DE}$, $X \in \overrightarrow{AB}$, $Y \in \overrightarrow{AB}$

, XDEY is a rectangle , $\overline{AD} // \overline{BE}$

, DE = 12 cm. , YE = 24 cm.

Find : The area of the figure ABED



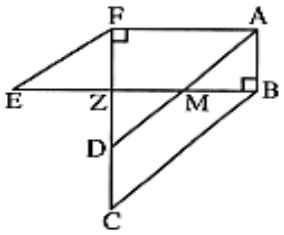
5 **In the opposite figure :**

ABZF is a rectangle

, ABCD , AMEF are two parallelograms

Prove that :

The area of ▱ ABCD = the area of ▱ AMEF



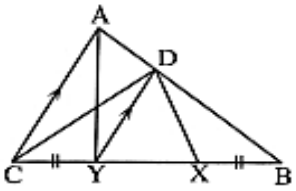
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6 **In the opposite figure :**

$\overline{DY}$ // $\overline{AC}$, BX = YC

Prove that :

The area of Δ BDX = the area of Δ AYD



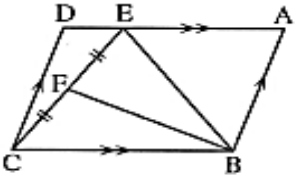
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7 **In the opposite figure :**

ABCD is a parallelogram whose area is 40 cm^2

, F is the midpoint of $\overline{EC}$, E ∈ $\overline{AD}$

Find : The area of Δ BEF



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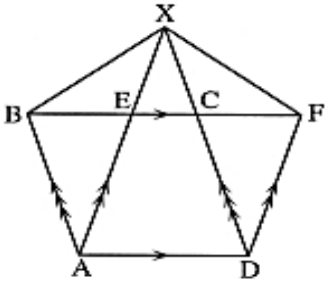
8 **In the opposite figure :**

ABCD , AEFD are two parallelograms

, $\overrightarrow{AE} \cap \overrightarrow{DC} = \{X\}$

Prove that :

The area of Δ ABX = the area of Δ DFX



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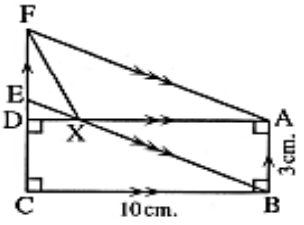
9 **In the opposite figure :**

ABCD is a rectangle

, AFEB is a parallelogram

, AB = 3 cm. , BC = 10 cm.

Find by proof : The area of Δ AFX



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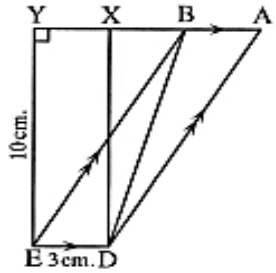
10 **In the opposite figure :**

$\overrightarrow{BA}$ // $\overrightarrow{DE}$, X ∈ $\overrightarrow{BA}$, Y ∈ $\overrightarrow{BA}$

, EDXY is a rectangle , $\overline{AD}$ // $\overline{EB}$

, ED = 3 cm. , EY = 10 cm.

Find by proof : The area of Δ ADB



Model 1

Total Mark 5

1 Choose the correct answer from the given ones : (3 Marks)

1 The area of a triangle is ..... the area of a parallelogram if they have a common base lying on one of two parallel straight lines including them.

(a) equal to (b) half (c) twice (d) quarter

2 The area of a rectangle is 40 cm^2 and its length 8 cm. , then its width ..... cm.

(a) 32 (b) 5 (c) 48 (d) 320

3 If the lengths of two adjacent sides of a parallelogram are 10 cm. , 8 cm. and the smaller height 4 cm. , then its area equals ..... cm^2

(a) 32 (b) 40 (c) 5 (d) 36

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2 In the opposite figure : (2 Marks)

ABCD is a rectangle , ABEF is a parallelogram

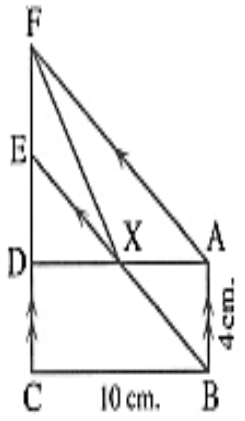
, $D \in \overline{CF}$, $E \in \overline{CF}$, $X \in \overline{BE}$

, AB = 4 cm. , BC = 10 cm.

Find :

1 Area of $\square$ ABEF

2 Area of Δ XAF



Model 2

Total Mark 5

1 Choose the correct answer from the given ones : (3 Marks)

1 The area of triangle = ... of the length of the base × its corresponding height.

(a) $\frac{1}{4}$ (b) $\frac{1}{3}$ (c) twice (d) $\frac{1}{2}$

2 If ABCD is a parallelogram , $E \in \overline{AD}$, the area of Δ EBC = 35 cm^2

, then the area of $\square$ ABCD = ... cm^2

(a) 35 (b) 70 (c) 17 (d) 17.5

3 The ratio between the area of the triangle and the area of the parallelogram which have a common base and between two parallel straight lines is .....

(a) 1 : 3 (b) 2 : 4 (c) 2 : 1 (d) 1 : 1

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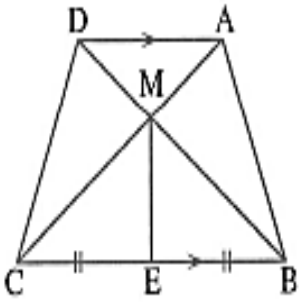
2 In the opposite figure : (2 Marks)

$\overline{AD} // \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, E is the midpoint of $\overline{BC}$

Prove that :

The area of the figure ABEM = the area of the figure DCEM



Model 3

Total Mark 5

1 Choose the correct answer from the given ones : (3 Marks)

1 The triangle whose base length is 12 cm. and its area is 48 cm^2 , then the corresponding height is .....

(a) 3 cm. (b) 4 cm. (c) 6 cm. (d) 8 cm.

2 If the lengths of two adjacent sides of a parallelogram are 9 cm. and 6 cm. and its smaller height is 4 cm. , then its greater height is ..... cm.

(a) 36 (b) 24 (c) 12 (d) 6

3 The ratio between the area of the parallelogram and the area of the triangle whose base is common and are included between two parallel straight lines equals .....

(a) 1 : 2 (b) 1 : 3 (c) 2 : 1 (d) 2 : 3

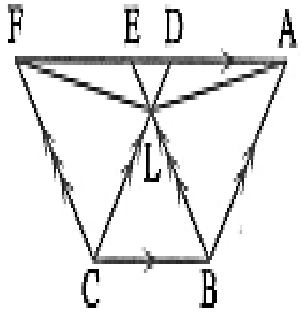
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2 In the opposite figure : (2 Marks)

ABCD , EBCF are two parallelograms

, $\overline{BE} \cap \overline{CD} = \{L\}$, $D \in \overline{AF}$

, $E \in \overline{AF}$



Prove that : The area of ΔABL = the area of ΔFCL

The Answers (1. Choose the correct answer)

1 (d)	2 (b)	3 (b)	4 (a)	5 (d)
6 (b)	7 (c)	8 (b)	9 (d)	10 (d)
11 (b)	12 (c)	13 (b)	14 (b)	15 (c)
16 (d)	17 (c)	18 (b)	19 (b)	20 (c)

The Answers (2. Answer the following)

1

The area of the parallelogram $= 6 \times 5 = 30$ cm^2

2

(1) The area of $\square$ ABCD $= BC \times DX = 18 \times 10$

$= 180$ cm^2

(2) $DY = \frac{\text{the area}}{AB} = \frac{180}{12} = 15$ cm.

3

$\because$ ABCD is a rectangle $\therefore \overline{AD} \parallel \overline{BC}$

$\therefore \overline{AD} \parallel \overline{EF}$

, $\because \overline{AE} \parallel \overline{DF}$

$\therefore$ AEFD is a parallelogram

, ∵ the rectangle ABCD , ▱ AEFD have the common base $\overline{AD}$, $\overleftrightarrow{AD} // \overleftrightarrow{BF}$

∴ The area of the rectangle ABCD

= the area of ▱ AEFD

Subtracting the area of Δ AMD from both sides

∴ The area of the figure ABCM

= the area of the figure DMEF (Q.E.D.)

4

∵ $\overleftrightarrow{AB} // \overleftrightarrow{DE}$

, $\overline{AD} // \overline{BE}$ ∴ ABED is a parallelogram

, ∵ the rectangle XYED , ▱ ABED have the common base $\overline{DE}$, $\overleftrightarrow{AB} // \overleftrightarrow{DE}$

∴ The area of ▱ ABED

= The area of the rectangle XYED

, ∵ the area of the rectangle XYED = 12 × 24

= 288 cm²

∴ The area of ▱ ABED = 288 cm² (The req.)

5

∵ ▱ ABCD , □ ABZF have the common base $\overline{AB}$

, $\overline{AB} // \overline{CF}$

∴ The area of ▱ ABCD = The area of □ ABZF (1)

, ∵ ▱ AMEF , □ ABZF have the common base $\overline{AF}$

, $\overline{AF} // \overline{BE}$

∴ The area of ▱ AMEF = The area of □ ABZF (2)

From (1) and (2) :

∴ The area of ▱ ABCD = The area of ▱ AMEF

(Q.E.D.)

6

∵ ΔΔ BDX , DCY have equal bases in length and on one straight line and they have the same vertex D

∴ The area of Δ BDX = The area of Δ DCY (1)

, ∵ ΔΔ DCY , AYD have the common base $\overline{DY}$

, $\overline{DY} // \overline{AC}$

∴ The area of Δ DCY = The area of Δ AYD (2)

From (1) and (2) :

∴ The area of Δ BDX = The area of Δ AYD (Q.E.D.)

7

∵ Δ EBC , ▱ ABCD have the common base $\overline{BC}$

, $E \in \overline{AD}$

∴ The area of Δ BEC = $\frac{1}{2}$ The area of ▱ ABCD

= $\frac{1}{2} \times 40 = 20$ cm²

, ∵ F is the midpoint of $\overline{CE}$

∴ $\overline{BF}$ is a median in Δ BEC

∴ The area of Δ BEF = $\frac{1}{2}$ The area of Δ BEC

= $\frac{1}{2} \times 20 = 10$ cm² (The req.)

8

∵ The two parallelograms ABCD and AEFD have the common base $\overline{AD}$

, $\overleftrightarrow{BF} \parallel \overleftrightarrow{AD}$

∴ The area of ▱ ABCD = The area of ▱ AEFD (1)

∵ Δ ABX , ▱ ABCD have the common base $\overline{AB}$

, $X \in \overleftrightarrow{DC}$

∴ The area of Δ ABX = $\frac{1}{2}$ The area of ▱ ABCD (2)

∵ Δ DFX and ▱ AEFD have the common base $\overline{DF}$

, $X \in \overleftrightarrow{AE}$

∴ The area of Δ DFX = $\frac{1}{2}$ The area of ▱ AEFD (3)

From (1) , (2) and (3) :

∴ The area of Δ ABX = The area of Δ DFX (Q.E.D.)

9

∵ The parallelogram ABEF and the rectangle ABCD have the common base $\overline{AB}$

, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CF}$

∴ The area of ▱ ABEF

= The area of the rectangle ABCD = 3 × 10 = 30 cm²

, ∵ Δ AFX and ▱ ABEF have the common base $\overline{AF}$

, $X \in \overleftrightarrow{BE}$

∴ The area of Δ AFX = $\frac{1}{2}$ The area of ▱ ABEF

= $\frac{1}{2} \times 30 = 15$ cm² (The req.)

10

∵ $\overleftrightarrow{AB} \parallel \overleftrightarrow{DE}$

, $\overleftrightarrow{AD} \parallel \overleftrightarrow{BE}$ ∴ ABED is a parallelogram

, ∵ the rectangle XYED and ▱ ABED have the common base $\overline{DE}$

, $\overleftrightarrow{AB} \parallel \overleftrightarrow{DE}$

∴ The area of the rectangle XYED

= The area of ▱ ABED (i)

, ∵ Δ ABD and ▱ ABED have the common base $\overline{AD}$

, $B \in \overline{BE}$

∴ The area of Δ ABD = $\frac{1}{2}$ The area of ▱ ABED (2)

From (1) and (2) :

∴ The area of Δ ABD

= $\frac{1}{2}$ The area of the rectangle XYED

= $\frac{1}{2} \times 10 \times 3 = 15$ cm² (The req.)